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The Physical Therapy Review

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Emergency Poliomyelitis Policies:

Hints to the Therapists

Dorothy A. Graves

With the approach of the summer months the possibility of epidemics of poliomyelitis becomes again a concern of those responsible for the treatment and care of persons contracting the disease. Each year there seems to be an increase of the endemic rate in some section of the United States which necessitates additional personnel and facilities. For the therapist who has "weathered" previous epidemics, many of the problems encountered under the pressure of the sudden increase of patients will be relatively easily solved. The new therapist, being initiated to an epidemic, will doubtless have some trepidation regarding the situation in which she finds herself. In this paper the attempt will be made to itemize for the visiting therapist and the permanent staff of the hospital some of the major points that should be considered in the emergency situation. As the care of the acute and convalescent poliomyelitis patient varies by locale, all of the following suggestions might not be applicable except in specific instances. No indications will be made as to the value of one treatment over another, and the main emphasis will be placed on the treatment of the acute patient. In the experience of the author it has been found that certain phases of organization for epidemics required consideration of a variety of factors. These factors will be discussed first from the standpoint of the visiting therapist, and secondly, from the point of view of the permanent hospital staff.

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Indoctrination of the Therapist

On arrival, the therapist enters into a new situation which requires a proper introduction into all phases of hospital life which will affect her and her co-workers. Even though the epidemic be at its height, a few days spent with the new worker at the beginning makes her stay more profitable, not only from a personal point of view, but by the fact that her understanding of the job helps in the performance of her future duties and responsibilities and creates desirable attitudes.

The starting point, after the arrival of the new employee, usually is the personnel office. Here, all arrangements and introductions should be made to familiarize the therapist with payroll procedures, necessary forms to be filled in, and which persons are responsible for sundry business details.

Maintenance, if provided at the hospital, is one of the primary considerations. In a large institution it is not always possible to choose a room, but it is possible to make the therapist feel that she is a welcome guest and that every effort for

her comfort will be made. Any rules regarding keys, hours, quiet periods or cleaning regulations should be duly emphasized. The system of obtaining meals should be carefully explained, with a tour of the dining rooms and an introduction to the personnel of the dietetic department whenever feasible. A list might be prepared of some of the restaurants in the vicinity, points of interest to visit on "off" time, and available recreational facilities. An explanation of modes of transportation to and from various points should not be forgotten. Laundry provisions, rules and regulations affecting all such services, and required identification should be provided the therapist. If time clock cards are used, these should be thoroughly explained and clarified. It is helpful in many instances to have a printed copy of the hospital policies for each therapist, emphasizing those portions which apply to her.

Many times, one of the services that is left for the therapist to discover on her own is the telephone service. An explanation of the method of making inside and outside calls and the regulations governing them, with a knowledge of necessary extension numbers and procedures to follow in an emergency, will tend to help the therapist feel more adequate.

An assembled notebook showing all routine printed forms in use in the hospital is a great aid to the therapist in helping her to keep accurate physical therapy records and interpret the records kept by the physician and nurse. A great many conflicts between services may be avoided by a thorough knowledge of how treatments are ordered and how the orders are carried out by each separate service.

Especially necessary, if such methods are in use, is a thorough instruction in communicable disease technic with practice periods for applying and changing gowns, scrubbing or any other special items which must be observed for the protection of all concerned. When the time comes that the therapist is no longer closely observed for "broken technic" she immediately feels that she is now considered dependable and is accepted into the large communicable disease "family."

Finally, before being assigned a specific unit or ward the therapist should be introduced to all of the personnel with whom she will work. These introductions, if all made within the first few days, add to the confusion of the therapist. She should first become acquainted with the head therapist and her assistants, then gradually be introduced to other staff members, preferably a few at a time. A list of staff might be a helpful addition. If this procedure is followed the therapist has a better chance to become acclimated and will more quickly feel that she is part of a team of physicians, nurses, therapists and all ward workers dealing with the patient.

After the preliminary introduction to the hospital set-up, the actual explanation of the duties of the therapist should be carefully undertaken. Too often the therapist in an emergency situation is rapidly placed in charge of a group of patients in order that all patients may be covered. She gropes her way through seemingly endless procedures, learning them more or less by trial and error; sometimes doing what seems to her to be right, but proves to be wrong in the light of previous established practices. Much unrest, dissatisfaction, feeling of inadequacy, and unhappiness can be avoided if the daily routine is explained to each new therapist.

Her duties might include supervision of packers and teaching the application of packs. In this case she should have a knowledge of technic, type of packs used, methods of heating and caring for the packs, location of materials and supplies, and any specific regulations regarding application of packs as to variable orders, length of application, number to be applied, contraindications for use, and knowledge of any records or forms pertaining to the packers or the packs. As the packing routine is built around the nursing program, the therapist must know and observe the time schedule for nursing care, meals, rest periods and visiting hours. In no way should she interfere with any of the established medical and nursing procedures which are the first essentials for the acute poliomyelitis patient.

The actual physical therapy measures should be carefully explained. This calls for a consideration of policies on muscle testing, muscle reeducation, preparation of the patient on admission and for discharge, and limitations on patient activity. All instructions, if in printed form, will be of benefit to the therapist and will save much time and questioning in the future. At various times during an epidemic there probably will be medically conducted research with special equipment, medications or statistical surveys. The therapist must cooperate to the fullest extent, and by so doing will find herself stimulated and be eager to further her knowledge of the disease. By the time that the therapist is ready for her definite assignment, even though several days or possibly a week have elapsed, she now should be able to carry her full load as a regular member of the department. As the days go by, she will realize more and more

that a sound preliminary training period has been of inestimable value measured in terms of her complete satisfaction of a job well done.

THE HOSPITAL STAFF

During an epidemic the staff of an average physical therapy department is incapable of handling a greatly increased number of patients, so it must depend on outside aid in meeting the existing situation. These new members of the department can be either a great asset or a hindrance depending in large part upon their careful indoctrination. Staff members find themselves spreading out to take care of new responsibilities and added duties, often requiring them to assume a supervisory capacity. The additional red tape involved in an epidemic usually limits the physical therapist in charge of the Communicable Disease Unit from doing any physical therapy treatments. In that instance, she becomes a coordinator and there must be other available therapists to supervise the care of the patient and to train new workers. The instruction of the new therapist is a full-time job, depending on the number of new arrivals. The instructor must always have adequate time to thoroughly indoctrinate the therapist and remain with her for as long as is necessary. After that period she should always be available for consultation and assistance. Regular staff conferences should be a part of the planned program at times when all therapists are available.

Special phases of the instruction period will consist of the indoctrination which has been discussed previously, and the schedule and procedure for the physical therapy treatments. One must not assume that either the experienced therapist or the new therapist will automatically know what is expected of them. Their training, though excellent, might have been based on different concepts of treatment than are practiced in the specific institution. The longer a place has been established the greater will be the need for a preliminary training period to afford the new therapist an opportunity of learning the accepted procedures.

Such procedures include a clarification of terminology, explanation and interpretation of record forms, relationship of the therapy staff to ancillary services, and a knowledge of the program for the treatment of the symptomatology of the abortive, spinal and bulbar types of poliomyelitis, with emphasis on the respirator treated patient. Each therapist should be taught to recognize such symptoms as respiratory distress, cyanosis, swallowing difficulty, accumulation of mucous, abdominal distension, urinary involvement, hysterical manifestations and so forth. She should be familiarized with the nurses' chart, and check it regularly for temperature, pulse and respiration, as well as the general condition of the patient. Particularly she should be able to recognize signs of progression of the disease and know how to act accordingly. These details usually can best be accomplished in the early morning when the patient is undergoing nursing care and preparation for breakfast. A trained eye, on a walk through the ward, will quickly be able to see and judge the severity of symptoms so that treatment may be started as indicated and as soon as possible. This in no way implies that any patient should be neglected, but in an epidemic with a large number of admissions daily it is not possible to start all medically ordered packing measures and perform muscle analyses on all patients simultaneously. If the therapist is responsible for the packing it is essential that she learn to check the patients rapidly so that the packers may prepare and apply the necessary packs within a reasonable time.

A knowledge of equipment in use on the ward for the patient is another requisite for the therapist. Although she will not be expected to manipulate all equipment, a knowledge of its usage will be extremely helpful. Suction apparatus, oxygen tanks, special appliances for tracheotomy patients, positive pressure machines and respirators usually are managed by the nurse. The therapist also will be working with the patient who is dependent on these modalities, so should understand their place in the treatment. When working with respirator patients she should have a basic knowledge of the respirator mechanism, what to do in cases of emergency, precautions to observe when opening and closing a respirator, how to aid in placing the patient in the respirator, adjustments within the respirator for the comfort of the patient, limitations expected in the physical treatment of the patient, and above all how to have the proper psychological approach to help develop desirable attitudes in the patient. This approach, while particularly essential in the care of the respirator patient, should not be neglected when dealing with other patients. The instructor should be explicit in her explanations and directions of what to say and not to say, when to say it, and to whom it should be said.

If the staff therapist does her job well, all of the foregoing suggestions will be given some consideration. Perhaps there will be other procedures, not mentioned above, that also might be considered. In actuality, the performance of the visiting therapist in any new situation depends in great part on how well she has been introduced to the entire hospital set-up. This seems to place the

burden for the end results of all emergency therapists directly into the hands of the supervising staff therapists. Nevertheless, the author has found that an observation of these details has played an important part of the all-round adequate coverage of an epidemic and has proved to be more satisfactory from the viewpoint, not only of the visiting therapist, but of the permanent staff as well.

To summarize, an outline has been compiled to itemize grossly the contents of this article.

Indoctrination

I. Policies
  A. Institutional regulations
    1. Personnel Office
      a. Payroll, necessary forms, etc.
    2. Maintenance
      a. Rooms
      b. Meals
    3. Laundry
      a. Personal
      b. Uniforms—number per week, etc.
      c. Procedures of sending and receiving
    4. Time cards
    5. Telephone calls
      a. Local
      b. Long distance
      c. Professional
  B. Departmental
    1. Introduction to staff
      a. List of personnel
      b. Responsibilities to supervisory staff
      c. Records
        (1) Forms assembled in note book
        (2) Where filed, when due, etc.
      d. Transfer of patients to other wards, hospitals or home
  C. Communicable Disease Unit
    1. Isolation technics in use
    2. Nursing and medical service routines
    3. General orders for physical therapy treatment
      a. Responsibilities of therapist vary with policy of supervising physician
    4. Packing
      a. Location of packs determined by physician or, if he wishes, by therapist
      b. Record forms in use
      c. Cutting, storing, etc.
      d. Method of heating, care, etc.
      e. Make-up of bed, foot-boards, blankets, etc.
    5. Other equipment
      a. Suction apparatus, oxygen tanks, respirators, etc.
    6. Research
      a. Therapist should assist to fullest extent
    7. Respirator patient
      a. Care and use of respirator
      b. Psychological factors

Physical therapy procedures

I. Observation of patient
  a. Clinical evaluation of symptoms
  b. Signs of progression of the disease
  c. Indications and contraindications for treatment

II. Packing
  a. Begin routine as soon as indicated
  b. Number to be applied, length of time left on, variable orders, etc.

III. Muscle analysis
  a. When done, how often repeated
  b. Accuracy and neatness of records
  c. Procedures used for sending records to other hospitals
  d. Specific gradings used, terminology, explanations, etc.

IV. Muscle reeducation
  a. Tendon stimulation, ranging, exercises, etc.
  b. Walking, activities out of bed, etc.
  c. Proper positioning for reading, eating, writing, etc.
  d. Home routine following discharge

V. General considerations
  a. Personnel relationships
  b. Limitations in conversation with patient, visitors, etc.

Essentials of Professional Ethics in Physical Therapy

Mary E. Haskell

In the Code of Ethics adopted by the American Physical Therapy Association we outline the general principles of our professional ethics and thereafter proceed to interpret our responsibility to each one of these three groups: the physicians, the patients, and our associates. These rules of professional conduct which we propose to follow are very truly a projection of those general principles of morality including both the science of the good and the nature of the right.

Those of us who have had opportunities for widespread clinical observation recognize fully the opportunity as well as the necessity you who are most intimately connected with education find to include the principles of professional ethics in each course that is taught and to see it through each clinical training affiliation above and beyond the five hour minimal essential set up by the Council on Medical Education and Hospitals for the course on Ethics and Administration.

The application of professional ethics may be neglected and the principles become merely forgotten words when most needed under normal conditions. An epidemic creates an emergency. A synonym for emergency is crisis. Crises call for behavior patterns that are previously established and completely dependable. Certain undependable ethical reactions have come to our attention in the emergency program of physical therapy for infantile paralysis patients. In order to change this, every qualified physical therapist must at all times be a teacher of ethics by her constant and undeviating example.

Observations of physical therapy services in some recent epidemic areas point out how our Code of Ethics may be applied in these situations as well as to the general practice of physical therapy.

When we consider responsibility to the physicians, to the patients and to each other we find that each one of these deserves equivalent consideration. Our responsibilities compose an equilateral triangle whose angles may not be distorted. The nature of poliomyelitis epidemics is such that each angle is increased equally and the physical therapist must adjust accordingly to three greater angles.

Polio Consultant, American Physical Therapy Association. 1790 Broadway, Room 512, New York 19, N. Y.

Responsibility to the Physician

The complexities of this responsibility in regard to the treatment of infantile paralysis patients are well known to most of you. Physical therapists may be called upon to administer treatment not previously recommended or, on the other hand, may be expected to diagnose and prescribe. In proportion to other pathological conditions, the treatment of infantile paralysis probably receives more emphasis in physical therapy training than it does in medical or other allied professional training. Here, then, issues the physical therapist's responsibility for sharing knowledge and skills, never forgetting that as a physical therapist you are one of a team directed by the physician and always respecting his responsibilities.

In several cases physicians have been extremely charitable in requesting replacement of physical therapists who refuse to carry out orders. They have also been professionally courteous where physical therapists have arbitrarily usurped responsibilities designated to physicians and hospital administrators.

Responsibility to the Patient

Sections from our Code of Ethics, in this instance, clearly state procedure which should be strictly observed in work with infantile paralysis patients.

"The physical therapist must avoid all actions or statements which in any way might be construed by the patient as criticism of the physician in charge or his handling of the case.

Likewise disparaging remarks or implications concerning professional co-workers, particularly those who previously have dealt with the patient, should be studiously avoided. It is essential that the patient have faith in his treatment and therefore desirable that he respect the professional personnel involved in his case.

"Specific statements concerning the patient's prognosis should be made only by the physician in charge. Definite statements from the physical therapist, however casual they may appear, may prove to be confusing or embarrassing in the course of treatment and are ill advised.

"All suggestions regarding medical referral are the responsibility of the physician and should not be made by the physical therapist."

In all instances where these admonitions are disregarded, physical therapy as a profession loses respect and individual integrity suffers.

Physicians have reported that physical therapists held follow-up clinics independent of medical direction in which physicians' orders were criticized or changed. Parents became agitated and confused, physicians lost confidence in the profession and patient progress was retarded.

RESPONSIBILITY TO OUR ASSOCIATES

In temporary emergency work with infantile paralysis patients it is the relationships with other physical therapists and with allied professional workers that decide the effectiveness of the total physical therapy program. Physical therapists and other personnel with varied training and experience are assigned to work together and often to supplement the permanent services in a hospital. Where this occurs it is especially important to discuss and agree upon overall procedures which will be most beneficial for a particular group of patients, and to provide for discussion and exchange of ideas between the allied services in order to achieve the greatest good for the patient. Lack of permanence unfortunately is not conducive to a sense of responsibility, but there is an even greater necessity in these instances to share skills and knowledge, to maintain standards and to adhere closely to the principles of professional ethics. These principles must constantly be projected further into manifestations of good will, common sense and helpfulness.

Successful treatment of the patient must be firmly established through loyalty and understanding between physical therapists; cooperation and understanding between allied professions; respect and understanding between physical therapist and physician; and finally consideration and understanding for employers. These principles cannot be disregarded.

Under the pressure of emergency conditions there still is no time to neglect the rules of good conduct:

Courtesy must be constant.
Service must obliterate self.
Personal appearance must be impeccable in uniform and off duty.
Business ethics must be observed.

The details of business transactions often are disregarded by those trained in the professions. We find this to be true of physical therapists even when definite rules are prescribed. Prompt response to communications, notification of address changes, and accurate expense accounting stimulate confidence and consideration.

Physical therapy is a service. Those who enter the profession are automatically invested with the responsibility of constantly maintaining and elevating the status of this service. In recognition of emergency conditions, compensatory remuneration has been offered. Physical therapists must reciprocate by accepting and adjusting to emergency conditions. This does not include expecting accommodations to be furnished for husband or wife and dog. It does include the expectation that supplies and equipment may be short or improvised, that living and working quarters may be temporary and crowded and that these situations call for ingenuity, patience, understanding, cooperation and leadership.

In one area last year a printing office was converted into a temporary poliomyelitis hospital pending the construction of a specialized hospital for poliomyelitis patients. In other areas vacant temporary Army installations have been used. One hospital erected Army field tents on its lawn to be used as wards.

Patient care and interprofessional cooperation must be placed above preoccupation with financial compensation, spare time, social diversion and self advancement. Thus is provided an opportunity to win professional recognition as well as increasing justified self-respect.

Physical therapy as an integral part of medical service devoted to the best welfare of the patient must be skillfully administered by physical therapists who accept responsibility. Our professional stature has risen with our standards of training and skill and the application of principles of professional ethics. The share of responsibility each one of us accepts in working with physician, patient and associate is a large factor in determining the extent of our stature.

"Polio" Assignments:

Suggestions for Physical Therapists

Virginia Harker, B.S., M.S.

The following suggestions are offered to physical therapists going out on their first epidemic assignments. Unfortunately, anterior poliomyelitis strikes where it chooses and the professional guidance to be found in medical centers, more often than not, is entirely missing. The physical therapist, therefore, must be resourceful. There are responsibilities far removed from this field, such as training nurses to operate respirators, directing volunteer workers, and helping architects design building changes. These should not be delegated to a physical therapist but, when no one else is available, they must be assumed as a moral obligation.

1. *Utilize Community Facilities.* No matter how small or how large a community, it has innumerable organizations which are willing to help if the physical therapist will only make needs known to them. Municipal, social and welfare groups will singly, or collectively, perform many of the services essential to the operation of a poliomyelitis unit, and will be pleased to have the opportunity of contributing to its success. Their services range from securing respirators to sewing knee rolls. In addition to these organized groups, interested individuals will make all types of helpful contacts which an incoming therapist, as a complete stranger to the community, is not in a position to make.

2. *Educate the Public.* Since, in the final analysis, public interest and public funds make poliomyelitis treatment possible, the physical therapist must be prepared to acquaint the community with the need for treatment and to give concrete evidence of the worth of the program which community support has made possible. It should be considered part of the job to accept all invitations to lecture to community groups, to be guest speaker at dinners and to participate in radio and school programs.

3. *Secure Equipment.* As a prerequisite for adequate treatment, certain types of equipment not usually found in a general hospital are essential. These should be obtained as rapidly as possible. All of them can be made quite simply by community groups if the physical therapist furnishes drawings or patterns in each size desired. All equipment should be practical in that it serves the purpose for which it is needed. It should be durable, inexpensive, attractive and easily cleaned. It should be either adjustable or provided in varied sizes because the patient turnover in an epidemic is very high. As illustrative of practical, easily cleaned and attractive equipment, sandbags can be made by covering the ticking or canvas with brightly figured cotton, and covering that in turn with oiled silk or plastic material. A different colored background is used for each size. Similarly, sizes of knee rolls, restraints, G-strings and gowns can be indicated by different prints. Interesting patterns on materials which would otherwise be plain, solid colors are morale builders for patients.

Later, when convalescent patients require more expensive equipment, the same volunteer groups will have these made locally. A good volunteer welder can easily make fracture bed attachments and adjustable bed suspension sling apparatus at about one-twentieth the cost of factory-made equipment. A shoemaker can make Bennett slings at approximately one-fourth the price a bracemaker asks. A skilled carpenter can make wheelchair and dining room chair attachments so that false backs and footrests can be adjusted in a few seconds to fit any size patient.

4. *Request Assistance Within the Hospital.* When tactfully approached, the administrator, the board of trustees, the staff physicians, the nursing service, the purchasing agent, and the housekeep-

Physical Therapy Supervisor, Central Carolina Convalescent Hospital, Inc., Greensboro, North Carolina.

ing department will all be glad to help initiate the physical therapy program. Hospital policies must be respected but, when emergency needs are pointed out and recognized, it is amazing how fast the proper authorities can cut red tape to secure the essentials for physical therapy treatment.

5. *Appreciate Responsibility of Physicians.* It is the physician alone who is responsible for prescribing and ordering all changes of treatment. He depends upon the physical therapist, who treats the patient regularly, to note and report accurately each patient's progress and indication for change of prescription. An interchange of ideas between the physician and the physical therapist, in which each respects the opinion of the other, is essential to good treatment.

6. *Have Uniformity of Treatment Within the Department.* During an epidemic physical therapists are recruited to the department from all over the country. Naturally, both their training and their experience vary. Although various technics have merit, it is necessary that treatment procedures be standardized within the department itself. As each new recruit or group of recruits joins the staff, the treatment policies should be carefully explained and demonstrated, and it should be clearly understood that they are to be followed unless different policies can be shown to be more effective. Each staff member should be made to feel free to suggest changes which will be considered carefully, for only by a pooling of knowledge can the group as a whole benefit from the maximum contribution each member is able to make. This freedom of expression regarding theories and technics enables the staff to reach a common denominator if each physical therapist is willing to give a little and take a little. One logical method of arriving at uniformity of treatment is to have the entire staff meet periodically to discuss policies and procedures.

7. *Have Frequent Meetings.* Cooperation with all professional associates within and outside the hospital can be secured most easily by having frequent and well planned meetings with them. Specifically, these groups include physicians, physical therapists, staff nurses, visiting nurses associations, county and city health departments and welfare agencies. At these meetings the objectives of treatment methods and the part that each of these associated groups should play in making an integrated program possible must be outlined. Perhaps the most important of these meetings are those with the staff nurses, because complete understanding and cooperation between the physical therapy department and the nursing service are an absolute necessity if treatment is to be effective. Simple courtesy and professional ethics demand that requests and the reasons for them, not orders, be given staff nurses. Mutual planning should be encouraged and incorporated into the program. A word of recognition for nurses' efforts will many times accomplish wonders in patient welfare.

8. *Recognize the Volunteers' Contribution.* The physical therapist will often have a part in coordinating the program of volunteer workers. Volunteer leaders may direct programs in education, recreation, arts and crafts, entertainment, music and religious education. After the worth of these programs has been proven, specialized departments often are incorporated into the hospital budget. In addition to professional groups, many laymen will be anxious to help in offices, wards, dining and sewing rooms. All volunteer work must be organized and carefully supervised.

9. *Keep Parents Advised of Patient's Condition.* Too many times, under the stress of epidemic conditions, consideration is not given to the parents. They have a legitimate right to know the present status of their child's illness and, insofar as can be determined, the probable handicaps the child ultimately must face. The issuing of medical information cannot be delegated to anyone who is not technically qualified for the task. If resident physicians or hospital social service departments are available, either can take over the responsibility of keeping the parents informed of the patient's progress. If neither exists, the attending physicians may ask the physical therapist to do this. Appointments must be arranged at times which do not interfere with treatment, such as during visiting hours, rest periods or at mealtimes. Regardless of who does the interviewing, a brief written summary of the conference should be placed in the chart. This procedure will eliminate the issuance of conflicting information. These conferences serve a dual purpose because at the same time the physical therapist gives information to the parents, she is able to obtain information which will affect future treatment plans for the child.

10. *Secure Information Regarding Patient's Home.* The home environment to which the patient will return should influence the decision as to the ideal time for discharge. In addition to the information secured during parent interviews, the use of mimeographed forms will save much time in obtaining facts which are applicable to every patient. A social agency can be of great assistance in securing this information. The questionnaires determine whether certain facilities are available for the patient, such as hot tubs, properly equipped beds, adequate diet, transportation for out-patient appointments, and so forth. The financial standing

of the family is secondary to the parents' understanding of the importance of home treatment and their willingness to be faithful in carrying out home exercise routines. The importance of competent follow-up home care cannot be overstressed.

11. *Keep Accurate and Complete Records.* It is imperative that accurate and complete records be kept. Each record should contain an evaluation of tightness and muscle power obtained as soon as possible after admission, even if it must be made by observation alone. Periodic muscle examinations and tightness checks must be recorded thereafter. Every change in treatment and positioning procedures and every appliance order should appear on the chart with the name of the authorizing physician. A chart should indicate a patient's progress from admission through discharge from the hospital to his condition at the last out-patient treatment. This systematic recording enables one to determine the rate of recovery, periods of no recovery or retrogression, response to changes in treatment and prognosis. In addition to these individual patient records, the type and number of daily in-patient and out-patient treatments should be tabulated.

12. *Expect to Work Overtime.* A physical therapist coming into epidemic work must be willing to work longer hours than would be required in a physical therapy department elsewhere. The personal satisfaction which is derived from helping poliomyelitis patients achieve optimum functional efficiency is sufficient compensation for the endless overtime hours. One must be practical enough, however, to realize that months of overtime will drain energy to the breaking point. When the department is functioning with relative efficiency, a sensible working day is indicated. When the physical therapist finishes each day's work, poliomyelitis problems should be left at the hospital. The psychological principle of balanced living is particularly applicable to the field of epidemic poliomyelitis work.

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Infantile Paralysis

and the Physical Therapist

Irmgard Bartenieff-Dombois

One of the most valuable and enlightening experiences for one who wishes to learn much about poliomyelitis is to work in a hospital for infectious diseases which has a poliomyelitis division or unit. It is only by observing great numbers of cases with the variations in types, amount of involvement, differences in age and personality that one can truly learn about this disease.

Poliomyelitis is a seasonal disease, usually starting in the early part of the warm season and reaching a peak in the latter part of August and early September. This is followed by a gradual decline. The four to five months following onset of the disease mark the busiest time for the physical therapist. About twenty to thirty per cent of all patients admitted are left with more or less permanent disabilities and it is this group which requires long hospitalization and carefully administered physical therapy.

The poliomyelitis patient is, throughout the whole course of the disease, a responsibility of both the nursing and physical therapy staffs. In the initial stages of the disease the patient is chiefly a nursing problem and in the later stages this proportion is reversed. But whatever part the nurse or physical therapist plays, both should consider it a cooperative task. The physical therapist can profit by information given by the nurse, such as eating and resting habits, behavior and general health. Very often such knowledge may help to explain certain reactions to the physical therapy treatment. On the other hand, observation of the physical therapy by the nurses may give them a clearer picture of the patient's disabilities and of the value of strict adherence to prescribed bed positions. Working together in this way is of great help to the physician since it facilitates the administration of a flexible treatment plan. The genuine interest in the patient's welfare and the unified approach to his problem which are the result of such teamwork will create a congenial atmosphere in which the patient will respond more readily to treatment.

Although treatment of the patient during the acute stage is chiefly a nursing responsibility, the physical therapist usually examines the patient in order to evaluate spasm and weakness and to work out proper bed positions. These seem small measures, but it is important for the physical therapist to see the patient at this stage in order to have a general impression of his illness and discomfort.

There is also a psychological factor which should be recognized. The child or adult who has a diagnosis of poliomyelitis already has suffered a number of shocks. Suddenly, as most case histories show, an extremity has failed to function or the patient has awakened to find himself unable to move. In addition, he usually has been examined by several physicians and has seen the anxiety and emotional upset of his family. For many small children it is the first hospital experience and the first separation from home. For the adult, who has some general knowledge of the disease, the word "polio" is frightening.

Through daily visits the physical therapist will learn all these pertinent facts regarding the patient and will make personal contacts before the actual physical therapy starts. The first contact may give the patient some reassurance and at the same time it forms the basis for a relationship which may last many months. Sometimes the nursing and attending staff is shifted frequently, with the result that the physical therapist is the only permanent person working with the patient. To young children especially, this permanency of contact is important.

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Digest of a talk given before the students of the New York University School of Physical Therapy, Spring 1949.

Only when they feel a security similar to that of home are they cheerful, responsive and eager to cooperate. From the first day the child enters the hospital, even while he is still quite ill, he should be visited frequently and an effort should be made to establish a friendly relationship. When it is time to start physical therapy his confidence already will have been won and no time is spent in preliminaries.

As an example of the value of gaining confidence, I recall the case of a boy of six years of age who was quite restless and apprehensive. He had breathing difficulty in addition to severe stiffness of the back, legs and neck. He had fallen ill while on a trip with his parents and everything in the hospital was strange and disturbing. Since he complained that he could not fall asleep I once stayed with him for a whole evening. The restlessness that is so characteristic of difficulty in breathing was finally quieted to some extent and he fell asleep. The confidence thus established was evident in all our future dealing with him, even in the painful procedure of stretching. This was possible only through the cooperation of the nurse in charge who realized that this contact would be valuable later on.

Although the bulbar patient is in most cases entirely a nursing problem, the physical therapist should be familiar with the symptoms as well as with the nursing procedures. As long as the patient cannot swallow and is on infusion and postural drainage, no physical therapy is given. But frequently we are asked to observe the breathing which may be disturbed in different ways. When spasm of the chest, abdomen and diaphragm is present in addition to bulbar disturbances, open packs may be prescribed and the therapist may be asked to apply these specialized packs.

In the subacute and convalescent stages nurse and physical therapist take the part of the parents to a greater extent and, as in a good family, they should use the same line of approach in whatever situations arise. For instance, if the children are severely disciplined in the ward and are given much more freedom in the treatment room, confusion and friction may arise to the disadvantage of the patient. A nursing staff which understands that the patient should be made self-sufficient and active is a great asset to the physical therapy staff. If an atmosphere of cheerfulness and confidence has been established it is comparatively simple to enforce disciplinary measures when necessary.

Adolescent boys or girls who have some realization of the implications of permanent disability may be inclined to brood and nurture anxieties. This is manifest in various ways and is a great hindrance to recovery. Often parents are unable to conceal their own anxiety and add to the intensity of the problem. It is only when the patient appreciates the importance of settling down to the immediate task of trying to recover that any real progress can be made. This adjustment is more difficult for adolescents and adults but very often is the key to effective treatment.

We know that every parent is anxious about such a long-term and serious illness in which no definite prognosis can be made for some time. Also, they are often beset by doubts resulting from widely publicized controversy regarding the value of different methods of treatment. Many will seek information from various sources even after having talked with the physician. It is well to have such eventualities discussed previously by the joint staffs and to have some agreement regarding information. In some cases, it is educational and reassuring to have the parents observe the treatment. Information gained by this contact with the parents or other relatives is helpful when the time comes for discharge. Such things as economic situation, number of children in the home, attitude of the family and other home conditions will influence the decision of the physician in the disposition of the case.

The treatment of the poliomyelitis patient is not terminated with his discharge from the hospital, particularly when there is any residual weakness or paralysis. He may be seen over a period of months or years and probably will continue treatment at home and at the outclinic. In the follow-up clinic the patient is re-tested on muscle grading and functional activities. The physician checks appliances, further treatment plan is discussed, school services arranged, and so forth. Many times it is the physical therapist who is able to find out how well orders are being carried out and how well the patient and his family are adjusted to his condition. Often the patient first fully realizes his handicap when he has returned to his home environment.

This paper has not dealt with actual physical therapy procedures. It is intended rather to emphasize that the entire relationship of the physical therapist to the poliomyelitis patient is as important as the complete mastery of technics and that the person entering this field of physical therapy must give more than just the skill of his hands.

The Measurement of Joint Motion.

Part III—Reliability of Goniometry*

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(Editor's Note: This is the third and last of a series of papers. Part I appeared in the May 1949 issue of the REVIEW, and Part II appeared in the June 1949 issue.)

The war and postwar periods have been marked by an increasing interest in the application of physiatric methods to the treatment of chronic diseases and traumatic injuries which affect man's capacity to do work. This trend gives increasing importance to devices capable of estimating the efficacy of different rehabilitation procedures, evaluating progress, determining the end-point of effective therapy and the degree of residual disability at the termination of treatment. One of the simplest tools for disability evaluation is the goniometer.

Estimation of the range of joint movement by eye is obviously too inaccurate to be of value when precision or objectivity are important to the management of the treatment program or the adjudication of disability claims. The use of instruments for measuring the range of joint movement for these purposes is generally conceded to be obligatory. Moore[1] has made a critical analysis of the many devices described in the literature, as well as the widely varying methods and nomenclature advocated, and has proposed a rational and defensible technic of goniometry. The object of this study was to determine the reliability with which the range of joint motion may be measured.

Goniometry usually is considered to be no more than a grossly quantitative technic. Curiously enough, relatively few efforts have been made to put this assumption to the test.[2] In the main, the problem revolves about measurement of intra-individual variability in the technic of application and the interpretation of observed results. If these are rigidly standardized, the repetitive measurements of a single observer are generally accepted as reasonably consistent. It is much less certain to what extent the findings of different observers may be expected to agree.

Most goniometers are simply constructed and instrumental errors *per se* may be assumed to be virtually negligible. However, a surprising variety of tools are available. It is, accordingly, of interest to know whether errors, inherent in the technic of application, vary significantly. If the universal goniometer is as reliable as special devices made to measure the range of motion in single joints, this is of practical importance from the point of view of economy as well as the development of a sound method of teaching the technics involved.

Many factors contribute to the apparent unreliability of range of motion measurements. Reasoning from first principles it would seem that movements occurring about uniaxial joints should be easier to measure than those which take place in biaxial or multiaxial joints. If the lever under study is part of a joint with a highly mobile girdle, the problem of estimating range of movement becomes increasingly complicated. With this thought in mind, Coulter and Molander[3] came to the conclusion that the determination of all angular movements in and about the shoulder joint must be necessarily approximate. Many years ago Cobe[4] drew attention to the amazing degree of fluctuation in the range of particular movements made repeatedly by a homogeneous group of intelligent and cooperative normal subjects, as determined by a trained observer using a precise measuring tool. In attempting to explain this phenomenon, Cobe postulated that the unreliability of successive

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movements was probably related to the fact that the usual range of movement about the various axes of the joint under study (wrist) was slight, and that volitional attempts to execute movements of maximal amplitude were not under sufficient control to permit accurate repetition. In reviewing these points it seemed desirable therefore to attempt to determine whether it was, in fact, more difficult to measure reliably the maximal movements occurring about the axes of rotation of some joints than those elicited in others.

Moore[1] has expressed the view that perhaps the single most difficult step in the technic of goniometry is localization of the axis about which the movement under study is occurring. This is indeed the crux of the problem, for axes of rotation shift during movement. Since the starting and final positions of the axis are not necessarily identical, the positioning of the patient and the measuring instrument assume a dominant importance in the technic of goniometry developed in association with this reliability study.

METHODS

The subjects of the investigation were thirty patients seen in the Division of Clinical Physical Medicine of the Baruch Center, the Arthritic or the Orthopedic Clinic. A variety of disabilities were represented. An effort was made to obtain cases demonstrating the widest possible range of bony blocks, intra-articular and extra-articular adhesions, and adaptive muscle shortening for purposes of protective fixation.

The study divides itself into two parts. The first was concerned with the reliability of the observer. It was designed to answer the simple question as to whether errors inherent in the technics usually employed by the average physical therapist are so great that measurements repeated by the same observer fall outside an acceptable margin of error. Is more precise standardization of procedure necessary? Should specialized training be offered? Should goniometry be performed only by physical therapists, and should joint range measurements on an individual patient always be made by the same physical therapist?

The major observations were made by one of us (M.L.M.), a physical therapist with more than average training and experience in goniometry. This observer was familiar with the historical development of joint range testing, problems of instrumentation, and the technic of experimental research. Her findings were accepted as criteria against which to validate the reliability of data accumulated by eight alternate observers. These were fully qualified physical therapists of varying experience. They were given no specific instructions or assistance. The ranges of joint motion measured by this group were determined by technics learned in six different training schools. Either the universal goniometer or one of the specially designed tools was used. The instrument selected was used by both the specially trained observer and the alternate. For purposes of statistical study the data of the alternates were grouped into a single series of observations to be compared with those made by M.L.M. on the same cases. Not more than two trials per movement were permitted per observer and the determinations of the alternate observer were routinely made immediately after those of M.L.M. Approximately an equal number of observations were made with the universal and the specialized type of goniometer.

The second part of the study was designed primarily to throw light on the reliability of different instruments. Observations were limited to joints of the upper extremity. The following thirteen ranges of motion were studied: shoulder joint flexion, extension, abduction, medial rotation and lateral rotation; elbow joint flexion and extension; radio-ulnar pronation and supination; and wrist joint flexion, extension, abduction and adduction.

All measurements were made by a single observer, M.L.M., who was well trained in the use of the different goniometers available. The positioning of the patient and the technic of applying each instrument were rigidly standardized. Each motion was measured with both the universal goniometer and the appropriate special device designed for the testing of a specific motion at a particular joint. All instruments were well constructed and made from durable materials. The special devices were built from specifications issued during the war by the Office of the Surgeon General of the U. S. Army.* Each motion was measured four times, twice with each instrument. All observations on patients so severely disabled that the maximal range of volitional movement was affected by the fatigue of four repetitive efforts were discarded.

The data accumulated in the second half of this study lend themselves to the answering of the third question posed in the planning of this research; namely, are the movements of some joints more accurately measured than the movements of

* The universal goniometer used was especially made for this study by the late James Hipple, chief instrument designer and mechanician of the shop maintained by the State of Wisconsin General Hospital and the School of Medicine of the University of Wisconsin. The Army goniometers were constructed by Mr. Benner, bracemaker in the shop of the D. T. Watson Home for Crippled Children, Leetsdale, Pa.

other joints? Can one establish the comparative reliability of goniometric observations made on different joints?

RESULTS AND THEIR INTERPRETATION

1. Reliability of Different Observers. The numerical evidence was derived from 1732 observations based on 13 movements measured on 77 patients. It is important to remember that only one of three variables is under consideration. The reliability of the observer is affected by the reliability of the instrument used and the differential susceptibility of individual joints to errors of measurement. Notwithstanding the possible effect of these two variables, the skilled observer, M.L.M., showed significant ability to repeat her own measurements. Of 780 paired observations made, M.L.M. obtained identical readings 21 per cent of the time; in 70 per cent of the measurements the second trial varied 3 degrees or less from that of the first; in 95 per cent the variation was 7 degrees or less.

Table 1 shows that when measurements were made by M.L.M. with the universal goniometer, there was a statistically significant difference between the means of duplicate measurement of elbow joint flexion and shoulder joint abduction. Differences in measuring supination and medial rotation of the shoulder joint also approach significance. Observations made on the same cases with the goniometers designed to measure particular movements in specific joints demonstrated themselves to be somewhat less reliable. This evidence is contained also in Table 1. Significant differences now occurred in duplicate observations of wrist flexion, and flexion, abduction and medial rotation of the shoulder joint. The differences of repeated measurements of pronation also approached significance.

The fact that differences in duplicate measurements of shoulder joint abduction and medial rotation are statistically significant or nearly so, irrespective of the instrument used, suggests that the difficulty probably lies in structural and functional peculiarities of the joint concerned rather than lack of reliability on the part of the observer. There is reason to believe that identical positioning might be more advantageous to the performance of movements in one direction than the reverse.

Further statistical analysis of the data accumulated indicates that the average physical therapists who comprised the group making alternate measurements of joint motion may, within limits, be considered reliable observers. The mean difference between 43 duplicated measures was 1.16 degrees, with a probability level between .10 and .20. This difference approaches significance as seen by the low level of confidence. However, when those

Table 1. Reliability of Goniometric Determinations Made by a Trained Observer

Movement Measured	Universal Goniometer			Special Instruments		
	M_x—M_y	CR	P	M_x—M_y	CR	P
Radio-ulnar Joint:						
Pronation	+0.60	0.69	.50	—1.30	1.88	.10
Supination	—1.53	1.76	.10	—0.10	0.01	.90
Wrist Joint:						
Abduction	--0.26	0.57	.58	—0.63	1.36	.20
Adduction	+0.30	0.38	.70	+0.50	0.94	.35
Flexion	—1.07	0.98	.30	—2.13	2.18	.05
Extension	—0.93	1.24	.23	—0.70	0.92	.33
Elbow Joint:						
Flexion	—1.00	2.51	.01	—0.50	0.87	.40
Extension	—0.10	0.23	.80	—0.40	0.95	.30
Shoulder Joint:						
Flexion	+0.26	0.49	.60	—1.83	3.25	.01
Extension	—0.47	0.72	.50	—0.13	0.19	.85
Med. Rotation	—1.00	1.74	.10	—1.10	2.00	.05
Lat. Rotation	—0.17	0.53	.60	—0.27	0.67	.50
Abduction	—1.53	2.25	.03	—2.70	3.95	.01

M_x indicates mean of the first trial; M_y, mean of the second trial. P=level of confidence.
$CR = M_x - M_y / m_x - m_y$.

movements which had shown low reliability when measured by the highly skilled observer M.L.M. were eliminated, the mean difference between the remaining 24 duplicate measurements dropped to .25 degrees and the level of confidence rose markedly (P: .80 to .90). The same high level of confidence was seen when absolute differences were used for analysis. Since all computations were made according to Fisher's statistics for small numbers of cases and the levels of confidence determined by Fisher's Table of the Distribution of *t*, it can be assumed that the average physical therapist is highly reliable when measuring those joint movements which in themselves are susceptible to reliable measurement by an instrument which is reliable.

It is of some interest to note that the average physical therapists who served as alternate observers did not duplicate their own measurements to the same degree as the more skilled operator, M.L.M. When estimates were based on the full and corrected series of observations, using the basis for elimination of movements described above, measurements were identical in 12 and 16 per cent of the duplicate trials respectively, repeatable to 3 degrees or less in 50 to 60 per cent, and to 7 degrees or less in 62 to 72 per cent. Thus, this gross measure of reliability indicates that the average physical therapist was less precise in her ability to duplicate repeated measurements than the more experienced and skilled observer, M.L.M. The important point is that the ability of the average physical therapists used in this study to duplicate measurements made by the skilled observer was statistically reliable for those joint movements already shown susceptible to reliable measurement. This is well illustrated by the evidence presented in Table 2.

Table 2. Reliability of Differences in Joint Measurements Taken by the Skilled Observer and the Average Physical Therapist

No. of Cases	M_x—M_y	CR	P
43*	—2.84	1.89	.05
24†	— .92	.53	.60

* Full series of movements.
† Elimination of movements not susceptible to reliable measurement.

However, different observers should not be used interchangeably to obtain measurements on the same patient unless the obtained data can be validated in terms of scales of normal variability for each individual observer.

2. Reliability of Different Instruments. As already stated, the estimation of the reliability of instruments reflects the differential susceptibility of individual joints to errors of measurement. The ability of a skilled and experienced observer to duplicate measurements made with the universal goniometer is recorded in Table 1, which also includes comparative data obtained from the use of a series of devices constructed to measure particular movements of specific joints. The question therefore arises whether statistically significant differences are due to instrumental ineptness or peculiarities in anatomical structure or functional use under the conditions imposed during clinical measurement of joint motion. If the levels of confidence with which successive maximal ranges of movement can be duplicated are low for both types of instruments used, both must be unsuitable or anatomico-physiological factors preclude accurate measurement by either tool. If, however, one yields measures which may be duplicated with an obviously higher level of confidence than the other, it may be assumed that the movement is susceptible to accurate evaluation and one instrument is more reliable than the other.

Table 1 indicates that the universal goniometer was, for most joint range determinations, a more dependable tool than the special devices in the hands of our observer, M.L.M., who was equally skilled in the use of both. The special goniometers constructed for the measurement of isolated movements of particular joints were used with an appreciably higher level of confidence only in the duplicate determination of the range of supination, elbow joint flexion and shoulder joint extension. Both yielded measures of approximately the same level of confidence for lateral rotation of the shoulder joint and neither were dependable for wrist joint flexion and extension and shoulder joint abduction and medial rotation. The differences in maximal range of motion measured successively with two different goniometers are presented in Table 3.

It is clearly evident that large and significant or nearly significant variations in observed joint range movements occurred when measurements were made successively on the same patient with two different goniometers. This was true for the measurement of all movements except wrist joint adduction and lateral rotation of the shoulder joint. The only logical conclusion to be drawn from the evidence accumulated by observer M.L.M. is that, with the possible exception of determination of lateral rotation of the shoulder joint, different

Table 3. Reliability of Goniometric Determinations made with Different Instruments (Universal Goniometer and Special Devices Designed to Measure Particular Motions in Specific Joints).

MOVEMENT MEASURED	$M_x - M_y$	CR	P
Radio-ulnar Joint:			
Pronation	—7.10	2.74	.01
Supination	—7.40	3.00	.01
Wrist Joint:			
Abduction	—2.77	1.70	.10
Adduction	+1.63	0.86	.40
Flexion	—5.40	2.01	.05
Extension	—5.77	2.10	.05
Elbow Joint:			
Flexion	—2.10	1.99	.05
Extension	—1.46	1.29	.20
Shoulder Joint:			
Flexion	—4.07	2.39	.02
Extension	+3.80	3.80	.01
Med. Rotation	—3.30	2.56	.02
Lat. Rotation	—0.93	0.68	.50
Abduction	+5.23	3.62	.01

M_x indicates the mean of measurements made with the universal goniometer; M_y, the mean of measurements made with the specific devices.

The least variable of the two duplicate measures were selected. These were the first trial for shoulder joint flexion, extension, medial and lateral rotation and the second trial for all others.

goniometers may not be used interchangeably even in the hands of one skilled and experienced in their technic of application.

3. Differential Susceptibility of Various Joints to Accurate Measurement. Joint movements which did not lend themselves to reliable repetitive measurement by either of the two types of instruments used were wrist flexion, medial rotation of the shoulder and shoulder abduction. The reasons for this are obscure but may bear some relation to the remarks made in the introductory sections of this paper. Cobe[4] points out that ordinary activities rarely elicit movements of maximal amplitude at the wrist. These are furthermore not limited by bony contact. Much depends on the effort made volitionally against ligamentous and tendinous resistance. Cobe found that successive measurements of wrist joint movements fluctuated so greatly even when made on cooperative normal subjects who had a thorough understanding of the purpose of the tests that he did not regard differences of 5 degrees of much significance unless they represented a progressive increase or decrease in motion. Hewitt[5] confirmed these observations on women and found that at times results fluctuated more than 100 per cent of the smallest amplitude of a particular motion. Repetition of a movement did not increase its range or the accuracy with which it was made, but intensive exercise over a long period of time increased the accuracy and range of maximal motions.

In the only other reliability study found in the literature, Wilmer and Elkins[2] observed that gross error in the ability to measure angles with a new optical goniometer approximated 5 degrees rather than 10 degrees, which is the limit usually accepted. They found that 99.5 per cent of the measurements made by a group of physicians did not exceed an error of ±8 degrees. The mean error of the physicians was —0.66 degrees ±0.14. This compares favorably with the most skilled observer in our series, M.L.M., whose mean error was a .76 when using the universal goniometer, and .95 when using the less reliable special devices designed to measure particular motions in specific joints. The mean error was appreciably greater, 1.16 degrees when the average physical therapists who served as alternate observers made duplicate determinations using the instrument of choice.

Wilmer and Elkins found that physicians had a 50 per cent chance of reading within ±1.7 degrees of the true angle. The variability of the observations made by the physical therapist was nearly twice as great as that of the physicians. In spite of that, the odds were still 95 per cent in favor of ability to read an angle to within ±10 degrees.

SUMMARY AND CONCLUSIONS

One thousand seven hundred and thirty-two observations were made on the active range of motion of the shoulder, elbow, radio-ulnar and wrist joints of patients with disabilities affecting these articulations. The measurements were made by well trained professional physical therapists using well constructed instruments either of the universal type common to all physical medicine departments or constructed in accord with U. S. Army Medical Corps specifications for application to individual joints for the measurement of particular movements. The experiments performed were designed specifically to test the reliability of a commonly used clinical procedure usually considered to be only roughly quantitative. The evidence presented supports the following conclusions:

1. The well trained physical therapist can measure the range of joint motion with a high degree of reliability.

2. Where intra-individual variability is known, the measurements made by different physical thera-

pists may be used interchangeably without destroying the reliability of clinical records.

3. Where the inter-reliability of different physical therapists has not been established, different observers should not be used interchangeably to obtain measurements on the same patient.

4. The universal goniometer is in general a more dependable tool than devices designed to measure particular motions in specific joints.

5. There is some evidence that the technical difficulties inherent in the application of goniometry may be significantly greater for certain movements of some joints than others.

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CALIFORNIA							
Children's Hospital, Los Angeles	Samuel S. Mathews	Sarah S. Rogers	a-b-d	14	Sept	$300	Cert. or Degree
College of Medical Evangelists, Los Angeles[1]	F. B. Moor	R. Wm. Berdan	a-b-c-d	12	Sept	$225	Cert. or Degree
University of Southern California, Los Angeles	Charles L. Lowman	Charlotte W. Anderson	a-b-d[2]	12	Sept	$496	Cert. or Degree
University of California Medical School, San Francisco[1]	Lucile M. Eising	Margery Wagner	d-e	12	Sept	$220[4]	Cert. or Degree
Stanford University, Stanford[1] (Palo Alto)	Wm. Northway	Lucille Daniels	a-b-d[2]	12	Jan June	$523.30	Cert. or Degree
COLORADO							
University of Colorado Medical Center, Denver	Harold Dinken	Mary Lawrence	a-b-d	12	Sept	$300	Cert. or Degree
ILLINOIS							
Northwestern University Medical School, Chicago	John S. Coulter	Gertrude Beard	a-b-d	12	Oct	$450	Cert.
IOWA							
University of Iowa Medical School, Iowa City	W. D. Paul	Olive C. Farr	e	12	Sept	$200	Cert.
KANSAS							
University of Kansas School of Medicine, Kansas City	Donald L. Rose	Lilyan G. Warner & Ruth Monteith	a-b-c[3]	12	Feb Sept	$80[4]	Cert. or Degree
MASSACHUSETTS							
Bouve-Boston School of Physical Education, Boston	Howard Moore	Constance K. Greene	H.S.	36	Sept	$500 yr.	Degree
Simmons College, Boston	Wm. T. Green / Arthur L. Watkins	Janet B. Merrill	a-b-d	16-36	Sept	$550	Cert. or Degree
Boston University College of Physical Education for Women: Sargent College, Cambridge 38	Ken'th Christophe	Adelaide McGarrett	H.S.	36	Sept	$435 yr.	Cert. or Degree
MINNESOTA							
University of Minnesota, Minneapolis[1]	Miland E. Knapp	Ruby M. Green	H.S.	36	Oct	$530[4]	Degree
Mayo Clinic, Rochester	Earl C. Elkins	Helen Belknap	a-b-c	12	Sept	None	Cert.
MISSOURI							
Washington University School of Medicine, Barnes Hospital, St. Louis[1]	Sedgwick Mead	Beatrice F. Schulz	e	2 yrs	Sept	$400 yr.[6]	Degree
St. Louis University School of Nursing, St. Louis[1]	A. J. Kotkis	Sr. Mary Imelda	H.S.	36	Jan Sept	$300	Degree
NEW YORK							
Albany Hospital, Albany	John W. Ghormley	Catherine Graham	a-b-d	12	Sept	$250	Cert.
Columbia University, New York City[1]	Wm. B. Snow	Floy Pinkerton	a-b-c	1 or 2 yrs	Sept	$450 yr.	Cert. or Degree
New York University School of Education, New York City[1]	George G. Deaver	Elizabeth C. Addoms	a-b-d	12	Sept	$589	Cert. or Degree
NORTH CAROLINA							
Duke University School of Medicine, Durham[1]	Lenox Baker	Helen Kaiser	a-b-d	15	Oct	$300	Cert.
PENNSYLVANIA							
D. T. Watson School of Physical Therapy, Leetsdale[1]	Jessie Wright	Kathryn Kelley	a-b-d	12	Oct	$300	Diploma
Graduate Hospital, University of Pennsylvania, Philadelphia[1]	George M. Piersol	Dorothy Baethke	a-b-c	12	Sept	$300	Cert.
TEXAS							
Hermann Hospital School of Physical Therapy, Houston	Oscar O. Selke, Jr.	Mary Elizabeth Kolb	a-b-d	12	Oct	$300	Cert. or Degree
University of Texas School of Medicine, Galveston	G. W. N. Eggers	Ruby Decker	a-b-d	12	Jan	$163[4]	Cert.
VIRGINIA							
Baruch Center of Physical Medicine of the Medical College of Virginia, Richmond[1]	Walter J. Lee	Susanne Hirt	a-b-c[5]	12	Sept	$351[4]	Cert. or Degree
WISCONSIN							
University of Wisconsin Medical School, Madison[1]	Harry D. Bouman	Margaret Kohli	a-b-c[2]	12	Sept	$120[4]	Cert. or Degree

[a]Courses are so arranged that any of the entrance requirements will qualify students for training. a = Graduation from accredited school of nursing; b = Graduation from accredited school of physical education; c = Two years of college with science courses; d = Three years of college with science courses; e = Baccalaureate degree; H.S. = High School graduation.

[1]Male students are admitted.

[2]High school graduates accepted for a four-year course leading to A.B. degree.

[3]High school graduates accepted for four-year college course.

[4]Nonresidents charged additional fee.

[5]Certificate granted by Children's Hospital Society; degree granted by University of California at Los Angeles.

[6]Tuition reduced second semester of second year.

Editorials

Meeting the Needs of the Patient with Poliomyelitis

The treatment of the patient with poliomyelitis requires the best efforts of all the members of the medical team. The physical therapist is a very important member of that team. Essential though this contribution is, the best interest of the patient is served only by intelligent and sympathetic cooperation of all the professional and lay personnel who come in contact with the patient from the physician in charge to the members of the family. A profession is judged not only by the preparation required for entering the field, but by the ethical standards maintained by those who are engaged in its practice. A relatively young profession is under continual scrutiny and the thoughtlessness of a single individual may negate the work of months and years.

The National Foundation for Infantile Paralysis recognized at an early date that it could not fulfill its pledge to the people that no poliomyelitis patient need go without care for lack of funds unless there were a sufficient number of properly qualified personnel to provide that care. This recognition of the necessity for training additional personnel if the needs of the poliomyelitis patient were to be met is the basis on which the professional education program of the National Foundation has been built.

One of the greatest needs has been for additional physical therapists. As early as 1942, the first physical therapy scholarships were awarded. In 1945 when the shortage was most acute, the $1,267,600 scholarship and teaching fellowship program was launched. At that time there were less than 1,000 physical therapists who were not in the hospitals of the Armed Services. With the addition of the $225,000 recently approved, the total allocated for this purpose is, in round numbers, $1,760,000. As of May 1st, 1,152 scholarships had been awarded for basic training in physical therapy and 25 fellowships for the preparation of physical therapy teachers from these funds.

Emphasis upon a recruiting program for physical therapy students of necessity placed additional strain on the educational facilities. Approximately $500,000 has been granted to physical therapy schools to permit increase in student enrollment and the quality of instruction. It also was realized that an intensive program to increase the number of physical therapists would create many problems which would require the guidance of the professional association. Therefore, since 1941 grants to the American Physical Therapy Association have been made in the amount of $136,300. This amount includes the grant of $31,774 in support of the educational program of the association for the coming year, which becomes effective on July 1st.

Although the National Foundation has never set any obligation for the scholarship student to accept employment only where he will work with poliomyelitis patients, it is interesting to note that 213 out of a total of 886 students who have completed their training have responded to the call for emergency physical therapists in epidemic areas. The interest and cooperation of the entire physical therapy profession in helping to meet the needs of the poliomyelitis patients is deeply appreciated by the National Foundation. Close to a thousand physical therapists have accepted emergency employment in epidemic areas since 1943. It is impossible to estimate the number who have served the poliomyelitis patient in the course of their regular employment.

The National Foundation looks forward with a great deal of confidence to the working arrangement with the American Physical Therapy Association, established for the first time this year, by which the Association will handle the recruitment of emergency personnel. No one knows what the season will bring, but it is to be hoped that through the teamwork of the professions and the voluntary and public agencies of this country the poliomyelitis patient in 1949 will be better cared for than ever before.

—CATHERINE WORTHINGHAM

Preparedness Program for Nurses

The "polio season" is with us. National and local agencies concerned in the needs of the poliomyelitis patient are increasing their activities in providing practical assistance.

Teamwork becomes the watchword as acutely ill people are admitted to hospitals and families are distraught with worry. It can become a frustrating or a challenging experience.

The hospital assumes the responsibility of providing personnel to give expert care which the personnel must know or learn to give. Saving life is of first importance. The physician, nurse, physical therapist, social worker, and occupational therapist must work together in giving expert care and planning for possible long-term care.

During the last four months the Joint Orthopedic Nursing Advisory Service (JONAS) has been cooperating with local nursing groups in eight states with preparedness programs in nursing care of the poliomyelitis patient. Institutes and courses are being given as a refresher or orientation program in nursing responsibilities. Demonstration and practice periods have been developed to include preparing the bed, handling the patient, adapting positions, applying fomentations with additional nursing skills required in the care of the bulbar patient and the patient in the respirator.

Arrangements with The National Foundation for Infantile Paralysis and American Red Cross have been completed for the assistance of JONAS in setting up training and orientation centers for nurses recruited or serving in an area where there is an increase of poliomyelitis patients which is taxing local facilities.

Suggested guides in developing course content and visual aids are available for the clinical instructor in poliomyelitis nursing. Representatives from JONAS are available to assist in the development of training centers on a local level. The American Physical Therapy Association and the Joint Orthopedic Nursing Advisory Service staff members have cooperated in the encouragement of joint planning by the head nurse and physical therapist in ward schedules, bedside care and treatment needs as well as preparation of the family and patient for going home.

Only through effective teamwork can continuity of service and satisfactory patient care be assured.

—JOINT ORTHOPEDIC NURSING ADVISORY SERVICE

Association Activities

Inactive Members

Have you considered accepting temporary assignment to work with infantile paralysis patients in epidemic areas? These emergency positions are for three to six months. The salary is $260 per month plus maintenance and round trip travel expenses.

The need this year is expected to be great and, as you know, there is an acute shortage of physical therapists. It is essential that infantile paralysis patients have physical therapy.

Please consider work of this type and let us know immediately if you are available this summer.

POLIO RECRUITMENT SERVICE
AMERICAN PHYSICAL THERAPY ASSOCIATION
1790 Broadway, New York 19, N. Y.
Tel. JUdson 6-2932

Physical Therapists for Poliomyelitis Emergency Program:

In Cooperation with The National Foundation for Infantile Paralysis

If you have any of the following qualifications and are available for emergency infantile paralysis work, notify the American Physical Therapy Association immediately so that you may be called when needed:

1. Graduates of physical therapy schools approved by the Council on Medical Education and Hospitals of the American Medical Association.
2. Members of the American Physical Therapy Association.
3. Senior registrants of the American Registry of Physical Therapy Technicians.

The American Physical Therapy Association is interested in your welfare and in cooperating to provide better physical therapy for infantile paralysis patients. Keep in touch with the National Office so that an exchange of ideas may further improve the program.

ASSIGNMENT

Will be made where physical therapists are not available locally. (The need will be determined by the Health Officer, the hospital administrator, a representative of the local National Foundation for Infantile Paralysis Chapter, preferably the chairman of the medical advisory committee and whenever possible a qualified physical therapist.)

Will be for a minimum period of three months and a maximum period of six months. (If physical therapists are released by the hospital before the completion of three months' service, they will be given one week's prior notice, or the equivalent amount of pay.)

POSITIONS

Will be those of staff physical therapists and physical therapy supervisors. (When the hospital cannot provide an experienced supervisor, the American Physical Therapy Association will assign a physical therapist with supervisory experience and ability who has also had experience in treating infantile paralysis patients.)

EMPLOYER

Will be the local hospital requesting temporary emergency personnel. Neither the National Foundation for Infantile Paralysis nor the American Physical Therapy Association employs physical therapists.

SALARIES

Will be $260 monthly for staff physical therapists.

Will be $285 monthly for physical therapy supervisors.

The local Chapter of the National Foundation for Infantile Paralysis will reimburse the employer for such salaries.

MAINTENANCE

Will be provided by the hospital for physical therapists recruited outside the community. If physical therapists recruited outside the community choose to live outside the hospital, they may do so provided they find their own accommodations. In this case they will be allowed the $75 per month stipend minus the cost of any meals or laundry furnished by the hospital. The local Chapter of the National Foundation for Infantile Paralysis will reimburse the employer for such maintenance.

TRAVEL EXPENSE

Will be paid by the American Physical Therapy Association to be reimbursed by the National Foundation for Infantile Paralysis.

From place of recruitment to place of assignment and

From place of assignment to place of recruitment.

Will NOT be paid

IF physical therapists resign before the end of the three month period.

IF physical therapists leave for holiday or vacation travel during an assignment.

Will include

Cost of plane or train accommodations. (If by car 5c per mile not to exceed cost of plane or train.) Allowance of $10 per day (24 hours) plus cost of hotel room if necessary between train or plane not to exceed $4 per day. (Those traveling by car will receive this allowance for only the length of time required to reach destination by train.)

PERSONNEL POLICIES

Physical therapists will not be sent to hospitals unless a physician is in charge to prescribe physical therapy.

Physical therapists cannot be sent to work under the supervision of unqualified physical therapists.

Recent graduates will be referred only to hospitals where experienced physical therapy supervision is available on a full time basis.

It is recommended that the daily case load per physical therapist shall not exceed a number which in the opinion of the physician in charge and the chief physical therapist may be cared for adequately.

Hours should conform to those of the hospital and physical therapists should not work less than 40 hours per week nor more than 48 hours per week. *In emergencies, professions provide adequate patient care at all times. It is considered to be the responsibility of the physical therapists to arrange their hours to conform to local needs and to be available for necessary patient care, confer-*

ences, clinic attendance and doctors' rounds as indicated at any time. It is expected that the hospital will extend to temporary physical therapists those privileges of sick leave and workmen's compensation which are extended to personnel employed regularly at that hospital. *Temporary assignments on an emergency basis do not indicate provision for vacation periods.*

It is expected that where several physical therapists are assigned to an epidemic area, adequate in-service training programs will be developed by the personnel of the hospital. Where this is not possible such service may be provided by the local chapter of the American Physical Therapy Association, physical therapy consultants of federal agencies and national organizations, members of National Foundation for Infantile Paralysis emergency teams, the American Physical Therapy Association consultant, and staffs from nearby hospitals and physical therapy schools.

It is expected that physical therapists will at all times maintain strict regard for ethical conduct and personal appearance and will assume individual responsibility for continuing high professional standards.

POLIO RECRUITMENT SERVICE
AMERICAN PHYSICAL THERAPY ASSOCIATION
1790 Broadway, New York 19, New York
Tel. JUdson 6-2932

Membership News

Marriages:

Jane Brigham of Williamsburg, Virginia, is now Mrs. Samuel D. Helfrich.

Nyla M. Bynum of Santa Barbara, California, is now Mrs. Nyla B. Wells.

June K. Campbell of Atlanta, Georgia, is now Mrs. June C. Williams.

Mary Rita de la Torre of Los Angeles, California, is now Mrs. Mary Rita McDonald.

June D. Essig of Phoenix, Arizona, is now Mrs. June E. Walker.

Martha Gale of Utica, New York, is now Mrs. Martha G. Thorngren.

Geraldine Gray of Chicago, Illinois, is now Mrs. Jack F. Murchison.

Eleanore Gorman of Newton Square, Pennsylvania, is now Mrs. Eleanore G. Courter.

Betty Ann Harlan of San Francisco, California, is now Mrs. Betty H. Beck.

M. Elizabeth Kennedy of Frederick, Maryland, is now Mrs. M. Elizabeth Medlin.

Martha Legler of Charlotte, North Carolina, is now Mrs. Martha L. Powers.

Judith W. Morgan of Glendale, California, is now Mrs. Judith M. Wheeler.

Nancy L. Nevin of Kansas City, Kansas, is now Mrs. William A. Marshall, Jr.

Harriet Olmsted of Battle Creek, Michigan, is now Mrs. Eugene Bottje.

Violet Pagendarm of Inglewood, California, is now Mrs. Violet P. Minardi.

Ann Rogers of Brooklyn, New York, is now Mrs. Ann R. Toole.

Lilian Sidwell of Buenos Aires, Argentina, is now Mrs. Lilian S. Gracial.

Beatrice I. Solberg of Laurel, Maryland, is now Mrs. John Tawney.

Lila M. Stark of New York City is now Mrs. Lila S. Hershey.

Dona Tegart of San Angelo, Texas, is now Mrs. Dona T. Price.

Dorothy Tudor of South San Francisco, California, is now Mrs. Dorothy T. Olson.

Rowena A. Walden of Rochester, New York, is now Mrs. Earl Boyd.

Eulia J. Whitlock of Jacksonville, Florida, is now Mrs. Anthony L. Statlis.

A. Muriel Wilson of Phoenix, Arizona, is now Mrs. A. Muriel Weber.

Chapter Activities

• *Iowa Chapter:* Members of the Iowa Chapter in and near Des Moines were privileged to attend a lecture on "Recent Advances in Physical Medicine" by Frank H. Krusen, M.D., of the Mayo Clinic, Rochester, Minnesota. The address was sponsored by the Polk County Medical Society at the Veterans' Hospital in Des Moines on May 16, 1949.

• *New York, New Jersey and Pennsylvania Chapters:* On May 20, 1949, the combined chapters of New York, New Jersey, and Pennsylvania met concurrently with the Middle Atlantic Hospital Association at Atlantic City, N. J., at its First Annual Convention. The program consisted

of a series of varied and instructive addresses from representatives of many related fields of medicine as follows:

A Physical Therapy Emphasis: Daily Activity Testing and Teaching—Mary Eleanor Brown

The Physical Therapy Department from the Administrator's View Point—Joseph P. Peters.

Physical Therapy in the Service—
Lt. Col. Edna Lura.

Physical Medicine for General Medical Conditions—Walter S. McClellan, M.D.

Physical Medicine in Neurological and Surgical Conditions—Carl L. Levenson, M.D.

Approximately fifty people, including graduate and student physical therapists attended this meeting. It provided an excellent opportunity for discussion of problems and interchange of ideas among the members of the various chapters who attended and was a successful start in what is hoped will be an annual series of tri-state meetings.

• *Washington Chapter:* Governor Langlie of the State of Washington recently appointed three members of the Washington Chapter of the American Physical Therapy Association to serve as the Examining Board in the state registration of physical therapists. Under the Physical Therapy Practice Act passed this year (1949) by the state legislature, this examining committee will make and administer tests to all qualified therapists who apply for registration in the State of Washington. The members appointed are Eleanor Loomis, Chairman—three year term; Miriam Killam—two year term, and Marguerite Irvine—one year term. The Board took over its duties on June 9th.

School Notes

• *University of Iowa Medical School:* For admission to the Physical Therapy Training School at the State University of Iowa, the candidate is required to have a Bachelor's degree with a major in a science. Upon certification outstanding students may continue graduate work leading to a Master of Science degree in Physical Therapy and Allied Subjects or a Doctorate degree in either Anatomy or Physiology.

At present five registered physical therapy graduate students are enrolled for advanced degrees. Three have been awarded the Master of Science degree and are continuing for the Ph.D. degree. They are: *Alma J. Murphy* was the first to receive a Master of Science degree in June 1948, with a thesis entitled "A Comparative Study of the Thermogenic Efficacy of Microwave and Short Wave Diathermy." *Charles J. Imig* received the Master of Science degree in August 1948. His thesis was on "Testicular Degeneration as a Result of Microwave Irradiation" and his research was reported in the Proceedings of the Society for Experimental Biology and Medicine. *Barbara L. Feucht* received her Master of Science degree in August 1948. Her thesis entitled "Thermogenic Effect of Certain Portions of the Electromagnetic Spectrum on Imbedded Metals and Metal Appliances" was reported in the Archives of Physical Medicine.

William Jahnke, a recent S.U.I. physical therapy graduate, and *Marjorie Hendry,* a physical therapy graduate of O'Reilly General Hospital, Springfield, Mo., are doing graduate work leading to a Master of Science degree in Anatomy. Their research is on the electromyographical evaluation of the activity of the hip, thigh and lower leg muscles of the human leg.

It is anticipated that outstanding students from the present physical therapy class will be enrolled for graduate study this summer.

New Members

• The following are newly accepted members of the American Physical Therapy Association:

Dorothy I. Briggs
Mrs. Carmen T. Costas
Florence Fellemende
Vera Homaighous
Anne Lewczyk
Elizabeth M. McCann
Margaret N. Meyer
Mrs. Alice M. Pettigrew
Rita A. Salmon
G. M'ree Wakefield
Mrs. Elizabeth Wiggins
Mrs. Barbara W. Lubeck (Foreign Trained—Member of Chartered Society, England)

• Recent graduates and former student members of the following schools:

Mayo Clinic:

Mary Lou Boyd

Sargent College:

Phyllis Abromson
Doris Lee Fiedler
Margaret Fitzgerald
Barbara Jane Freeman
Marcia Goretsky
Patricia M. Hemsley
Beatrice Levine
Mary Elizabeth Madden
Clare Ann Murray
Mrs. Elsie Spechler

University of Kansas:

Beth Joann Gossman

University of Wisconsin:

Virginia A. Kemp
Lorraine K. Lyle

General News

• Under the fellowships granted by the National Society for Crippled Children and Alpha Gamma Delta, international women's fraternity, fifteen specialists in vocational guidance from all parts of the United States will begin a special six weeks' training course in the personal and vocational guidance of the cerebral palsied on May 16, 1949, at the Institute of Rehabilitation and Physical Medicine of the New York University-Bellevue Medical Center.

The course, which will be under the supervision of James F. Garrett, Ph.D., Chief of the Vocational Services of the Institute of Rehabilitation, will include psycho-social and medical aspects, case study and evaluation and clinical study and observation of cerebral palsied persons.

• A workshop on the problems of children and adults with cerebral palsy will be presented July 25 to August 12, 1949, by the Division of Special Education, School of Education, Syracuse University, Syracuse, N. Y., in cooperation with the New York State Association for Crippled Children, Inc., and the Cerebral Palsy Division, The National Society for Crippled Children and Adults, Inc.

The purpose of the course is to offer by lecture, group discussion and demonstration, recent advances in cerebral palsy to professional workers, including physicians, nurses, nutritionists, physical, occupational and speech therapists, educators, psychologists, recreational and social workers, vocational advisers and placement officers, trade school staffs and employers' personnel officers. A specially arranged sequence of daily afternoon demonstrations with explanation designed to show a progression of graduated physical therapy technics for cerebral palsied children will be held, subject to the number of physical therapists registering. Thus, the course may serve the physical therapist not only as an orientation to the field of cerebral palsy but also as a specific review of physical therapy cerebral palsy technics. Registration will be limited to forty persons.

Mary Eleanor Brown, Physical Therapist, Field Consultant, New York State Association for Crippled Children, will be Workshop Coordinator, and William M. Cruickshank, Ph.D., Director, Special Education for the Exceptional, School of Education, Syracuse University, Syracuse, N. Y., will be Workshop Director. For further information and application, write the Workshop Director.

• Dr. Louis B. Newman has been recently appointed as a member of the Medical Advisory and Consultant Board of the Armour Research Foundation of Illinois Institute of Technology, Chicago, Illinois. This Board is to select suitable problems for research in the medical field and to advise an engineering staff on the medical aspects of these problems.

Doctor Newman, who is Chief of the Physical Medicine and Rehabilitation Service at the Veterans Administration Hospital, Hines, Illinois, received his degree in Mechanical Engineering from the Illinois Institute of Technology, just prior to studying medicine.

Pittsburgh Rehabilitation Center

The Pittsburgh Rehabilitation Center recently has been opened for the care of industrial injuries. The Center includes a department of physical medicine, corrective gymnasium and a curative workshop, all under well-trained technicians. The patients remain under treatment supervision from 9:00 a.m. to 4:30 p.m. daily. Meals and lodging are provided for those patients living out of town. The physicians in charge of this Center are Samuel Sherman, M.D., and Harry Epstein, M.D., of Pittsburgh.

Army and Air Force Uniforms for Women

An Advisory Committee of six women fashion authorities has been named by the Quartermaster General as consultants on the development of uniforms and clothing for women members of the Army and Air Force. The activities of this committee will include a long-range study of the clothing needs of women in military service, recommendations and approval of colors and fabrics most appropriate and becoming to military women in both peacetime and wartime. The Committee will give consideration to appearance as well as to usefulness of women's uniforms. It also will coordinate the application of the results of scientific and technical research on materials, environmental protection and functional design to the development and design of military clothing and uniforms for the women of the Army and Air Force.

Medical Film Award

On March 26, 1949, the Academy of Motion Picture Arts and Sciences announced that an "Oscar" for the best short documentary film of the year had been awarded the Army medical film "Toward Independence." Portraying step by step the rehabilitation of patients paralyzed as a result of injury to the spinal cord, the picture was made for the Army Medical Department by the Signal Corps, under the general production supervision of the Medical Illustration Service of the Army Institute of Pathology. Technical advice was provided by the Office of The Surgeon General and by civilian consultants assigned thereto. "Toward Independence" is available on a loan basis to all military personnel and to any nonprofit civilian group. The film may be obtained from the nearest Signal Corps Film Library or, if to be used for television, by writing to the Public Information Officers in the nation's six Army Areas: First Army, New York City; Second Army, Baltimore, Maryland; Third Army, Atlanta, Georgia; Fourth Army, San Antonio, Texas; Fifth Army, Chicago, Illinois; Sixth Army, San Francisco, California.

Women's Medical Specialist Corps

• *The Army Physical Therapy Training Program*—On May 13, 1949, the students in the Physical Therapy Training Course at the Medical Field Service School, Brooke Army Medical Center, Fort Sam Houston, Texas, completed the first phase of their training. These ten reserve officers in the Women's Medical Specialist Corps are now assigned to the hospitals where they will receive the second six-months phase of their training which will consist of further didactic instruction and supervised clinical practice. The next Physical Therapy Training Course will start at the Medical Field Service School on November 7, 1949, and will be preceded by an eight weeks basic course of orientation to army regulations, customs and procedures.

The twelve-week physical therapy training program for enlisted personnel began in May at the Medical Field Service School. These physical therapy technicians are being trained in such elementary assistive procedures as may be satisfactorily performed under the direction and supervision of the physical therapist. The purpose of the program is to increase the number of trained auxiliary personnel in army physical therapy sections so that the physical therapist may devote a greater amount of her time to the more skilled professional procedures.

In February and March, Captain Emily Fairbanks, now stationed at Walter Reed General Hospital, Washington, D. C., and 1st Lt. Mildred Anderson, now stationed at Fitzsimons General Hospital, Denver, Colorado, attended the six-weeks course in the Rehabilitation of the Physically Handicapped at the Institute of Rehabilitation and Physical Medicine of New York University. Captain Ada Gray currently assigned at Fitzsimons General Hospital has just completed the six-months course in Poliomyelitis at the Georgia Warm Springs Foundation. Major Agnes Snyder, presently at the Baruch Center of Physical Medicine, Medical College of Virginia, and Captain Olena Cole, presently at the University of Wisconsin Medical School, hope to complete their study toward a Master's Degree in Physical Therapy by fall of this year.

Following attendance at the conference of the American Physical Therapy Association in Boston, those physical therapists who are primarily concerned with the Army physical therapy training program will participate in a conference pertaining to training matters to be held in the Office of The Surgeon General.

• The following is an excerpt of a letter received by Miss Elson from Mary L. Bendure, Capt., WMSC, 387th Station Hospital, APO 154, c/o P.M., New York, N. Y.:

"The Bavarian Physical Therapy Association invited the U. S. Army Physical Therapists to their conference held in Munich on February 11 and 12. Capt. Ruth W. Ellinger, 1/Lt. Francine B. Bundt, 1/Lt. Mary A. Perta and myself attended. On Friday evening the group assembled in the lecture room of the University Neuroclinic where a series of papers were presented, supplemented with slides, X-rays and demonstrations. Doctor Boehm presented a paper on 'Indications for Massage and Therapeutic Exercises.' Exercise routines were demonstrated for patients with asthma and postpartum cases. Three case histories were shown: a woman with multiple sclerosis and two men with perivascular disturbances.

"On Saturday morning we toured the physical therapy clinics in the hospitals, watching the physical therapists at their work. The students demonstrated a routine for scoliosis: 'Klapp'schen Kreichubingen' basically similar to our scoliosis exercises. In the University Clinic the students presented a routine for constipation consisting of deep massage over the lower back and gluteals and trunk twisting and bending exercises with the patient in a sitting position on a bench during the entire treatment.

"The Germans use hydrotherapy extensively in

the form of baths, sprays, and pools but they have no whirlpools. In the clinics we saw portable radiant heat and light lamps, short wave diathermy machines, ultraviolet ray lamps and a unit with galvanic current. An old piece of Zander apparatus was pointed out but kept only as a show piece as they too emphasize active exercise. An ultra sound apparatus was demonstrated. The meetings were interesting but our small German medical vocabulary prohibited us from understanding any more than the surface of the topics discussed."

Coming Meetings

Date	*Organization*	*Place*
Aug. 23-27	American Occupational Therapy Association	Book-Cadillac Hotel, Detroit, Mich.
Sept. 6-10	American Congress of Physical Medicine	Netherland Plaza Hotel, Cincinnati, Ohio
Nov. 7-9	National Society for Crippled Children and Adults	Commodore Hotel, New York, N. Y.

Index to Current Literature

Anatomy

Anatomy of Hand in Relation to Tendon Repairs. H. Minor Nichols. Northwest Medicine, May 1949.

Anterior Poliomyelitis

Arming Against Polio. Julia Dupuy Smith. Public Health Nursing, June 1949.

Cerebral Palsy

Home Training for the Cerebral Palsied. R. E. Bruner. Spastic Review, June 1949.

Treatment of Cerebral Palsy. Carl L. Holm, Edmund V. Olsen and Robert S. Dow. Northwest Medicine, May 1949.

Chest Conditions

A New Approach to the Treatment of Emphysema and Asthma. Isobel Chard Cox. Physiotherapy, May 1949.

Electrotherapy

Recent Advances in Electroshock Therapy. M. E. Witte. Maine Medical Association Journal, November 1948.

Instrumentation in Relation to Electromyography: I: Factors Influencing Recording and Interpretation of Electromyograms. R. Plato Schwartz, Arthur L. Heath and Frederick W. Hudson. Archives of Physical Medicine, June 1949.

Instrumentation in Relation to Electromyography: II: A Discussion of Instrumentation Requirements for High Fidelity Electromyographic Recording Using Skin Electrodes. R. Plato Schwartz, Arthur L. Heath and Frederick W. Hudson. Archives of Physical Medicine, June 1949.

Miscellaneous

Some Implications of Atomic Energy in Physical Medicine. John Z. Bowers. Archives of Physical Medicine, June 1949.

Health Education in the United States. Arthur H. Steinhaus. Journal of the American Association for Health, Physical Education and Recreation, May 1949.

Water Safety for the Physically Handicapped. Ruth S. Ferguson. Journal of the American Association for Health, Physical Education and Recreation, May 1949.

Rehabilitation

Rehabilitation. Howard A. Rusk. Journal of the American Medical Association, May 21, 1949.

Abstracts

John S. Coulter, M.D.

Functional Testing and Training in Physical Medicine

Robert L. Bennett, M.D., Warm Springs, Ga. In ARCHIVES OF PHYSICAL MEDICINE, 30:5:263, May 1949.

Functional testing and training has become an important part of physical medicine in the care of certain neuromuscular and musculoskeletal diseases.

Fundamentally, the physical medicine of such problems falls into two basic routines. One routine is primarily concerned with specific retraining of the individual muscles or muscle groups and with all factors that might limit the most effective reeducation of these muscular units. This can best be called the phase of muscle reeducation. The other routine is primarily concerned with specific retraining of the patient as a whole and with the obstacles that must be overcome by that patient in order for him to live safely and effectively under normal conditions. This can be called the phase of functional training.

In the past, greater emphasis has been placed on the routines of specific muscle reeducation. Physical therapy has developed reliable methods for the testing of mobility of joints and strength and coordination of individual muscles making up the involved bodily segments. Functionally, the goal of physical therapy was too frequently limited to the involved segment or, at best, considered the patient as a whole only during walking reeducation and step climbing. A great gap existed between such a program and one designed for explicit vocational training. Such programs of vocational training for the physically handicapped could handle only persons who were sufficiently independent to cope with the physical demands of this training, but they did not provide means for bringing the patients to this level of independence. Occupational therapy attempted to fill this gap by emphasis on prescribed and supervised use of the arts and crafts to augment the programs of muscle reeducation. Even when the two programs were well correlated—and in many instances they were not—they fell short of teaching the handicapped patient to return to his home capable of getting about safely and eager and ready to avail himself of the opportunity of vocational training that he might be able to live effectively in a normal environment with physically normal people.

In general, physical therapy has the responsibility of restoring locomotion. More specifically, physical therapy has four basic objectives:

(1) To increase or set coordinate patterns of gross extremity and trunk movement.

(2) To increase strength and endurance in weight-bearing muscle groups, particularly in the trunk and upper extremities, when braces and crutches must be used.

(3) To teach effective patterns of motion, both normal and substitute, and/or use of apparatus for safe and practical locomotion.

(4) To maintain or obtain adequate mobility of bodily segments necessary to effective locomotion.

A more detailed use of physical therapy in functional training has been reported elsewhere, and will not be discussed further here.

Occupational therapy is responsible for the development of the finer skilled movements of the hand and the correlation of these movements with adequate trunk balance in the standing and sitting position and the further development of endurance and coordination in the shoulder groups. The detailed program of occupational therapy in functional training will be reported at a later date.

It is important to realize that recreation can and should be a therapeutic measure specifically to increase coordination, strength and endurance of weakened bodily segments. Like physical and occupational therapy, it, too, should be specifically prescribed for the individual patient. Recreation also is used to obtain what might be called social rehabilitation. Through intelligent recreational therapy we attempt to restore the patient's spirit of cooperation and/or competition, develop a spirit of sportsmanship and minimize his consciousness of his physical handicap and the apparatus he must use.

This paper has presented the functional test and its grading, along with the broad outline of functional training as used at the Georgia Warm Springs Foundation. Particular emphasis has been placed on the proper timing of functional training because it is felt that the greatest danger in such a program would be the initiation of functional activity before the patient was properly prepared for these activities by sound and thorough muscle reeducation.

Original Communications: The Role of the Sympathetic Nervous System in Acute Poliomyelitis: Preliminary Report

Emil Smith, M.D., Philip Rosenblatt, M.D., and Andrew B. Limauro, M.D., Brooklyn, N. Y. In JOURNAL OF PEDIATRICS, 34:1:1, January 1949.

The purpose of this paper is (1) to describe clinical observations of the sympathetic nervous system involvement in acute anterior poliomyelitis, (2) to record briefly the presumptive evidence, (3) to present conclusive evidence that angiospasm exists in the acute stage of poliomyelitis and may be responsible for muscle spasm and pain, and (4) to suggest practical methods for relief of pain and spasm.

Presumptive Evidence that Sympathetic Nervous System Involvement May Produce Angiospasm

External application of heat, in all probability, produces vasodilatation both in the chronic poliomyelitic extremity and in the extremity of Raynaud's disease. The improved circulation to the limbs may be responsible for the improved color, feeling of warmth, and diminution of pain and muscle spasm.

Methods for Relief of Pain and Spasm

Since hot packs were introduced for the relief of muscle spasm and pain, we have steadily looked for a more pleasant and less laborious method to replace it. Short wave diathermy produces clean, comfortable, controlled heat which is easily tolerated. We introduced it to an extremity showing angio- as well as muscle spasm with pain. After treating the extremity for a short period of time the muscle relaxed and the pain diminished or subsided. To bring more blood to a spastic muscle, a rhythmic constrictor was introduced to assist the dilated blood vessels in supplying blood to the ischemic muscle. Quicker and better results were obtained. The muscles relaxed and the pain diminished or subsided, only to return when the artery or arteriole went back to spasm.

Both hot packs and short wave diathermy produce vasodilatation with relief of muscle pain and spasm. Both methods require trained personnel and are very expensive.

Summary

We have demonstrated that short wave diathermy with the rhythmic constrictor dilated the blood vessels and increased the blood supply to the extremity. The muscles relaxed and the pain diminished or subsided only to return when the blood vessels contracted.

However, we feel that neither short wave diathermy nor hot packs are the solution for the relief of the muscle spasm and pain in acute poliomyelitis, since these methods do not produce sustained vasodilatation. The method of choice would be a drug that could be administered by mouth, subcutaneously, or by the intravenous route.

We fully understand that the subject matter in this paper is debatable.

Swimming is Healthful, But . . . — Do's and Don'ts for Instructors

Charles LeRoy Lowman, M.D., Chief Orthopedic Surgeon, Los Angeles Orthopaedic Hospital, Los Angeles, Calif. In THE CRIPPLED CHILD, 26:6:7, April 1949.

Organized courses are now being held for almost every type of physically handicapped person by many large public and private health organizations. The many considerations which are necessary for this particular "hydrotherapy" compel the instructor to think of each participant individually, and not only allow him to do all he can, but protect him from overexercising.

Instructors who teach the physically handicapped must at all times bear in mind the importance of restraining overactivity as well as limiting the use of strong muscles to the neglect of others that would most benefit.

Carrying the physical types in mind as a primary classification, the director will face the distinctions that must be made for the varying types of handicapped persons he will instruct. Polios and the cerebral palsied make up two major groups whose different pathological characteristics must be considered.

In cold water the polio victim must work very hard to keep warm. Even if his arms are powerfully developed from crutch-walking, the muscle pumps of his weak or atrophied legs may not be able to pump the blood back to his heart. Chilling of the skin further activates the vasoconstrictor nerves in the blood vessel walls which will further impair the circulation.

Such patients should have short swimming periods (in proportion to reaction), followed by cold friction rubs and alternate hot and cold packs or douches to improve the blood vessel tone. Tendency to overdo should be watched for. Since water is the only medium in which the brace-wearing or crutch-using polio is completely free, he tends psychologically to compensate for physical inferiority in other environments.

The instructor also must be alert to notice overuse of weak opponent muscles. Swimming by definition is progression in the water with the individual using any muscles that he can throw into action. These invariably are the strong muscles. When the instructor checks what is happening to the weak opponent muscles in the crawl stroke he will find that the pull down of the arm emphasizes the action of pectorals, serratus, latissimus dorsi and teres. If there are weak deltoids, trapezius and rhomboids, the muscular imbalance increases. Therefore, in this instance a polio patient should be taught a reverse back stroke to build up the weak, and not further shorten the strong muscles, which furthers muscular imbalance.

In the case of strong arms but poor abdominals, swimming on the face will activate back extensors each time the head is raised. With no opposition in front to stabilize the pelvis (the base from which the back extensors work), the result is increased lordosis, or hollow back. If the flexors of the hip joints are not involved, each time the legs are activated, the psoas (the chief thigh flexor) will pull forward on the spine and provoke a further increase of the hollow back.

If a psoas and the lateral joint muscle, the quadratus lumborum and external oblique of one side are weak, a lateral curvature is produced. When a flexible column is bent in two places the result is a torque; in other words, a spinal rotation or twist is induced.

Integrity of the abdominal wall muscles is necessary to stabilize the pelvis on the thorax, which is essential to good leg performance. If one leg is normal and the other is a weak or dangle leg, the fixation of the pelvis, to give it a base of action, will produce a lateral and rotary deviation of the pelvis and lower trunk. Technical understanding of abnormal kinetics is required to outguess such situations and prevent increase of, or progress towards, deformity. In the growing child it can easily be seen that the continuance of these assymetrical influences will induce more trunk deformity.

Thus a polio child in a state of rapid growth is especially vulnerable to all injurious influences. Continued use or overuse of strong muscles, imbalanced by weak opponents and improperly controlled stabilizers, will be an insidious deforming force. For such children, floating should be taught first, with progression from side-sculling to double elementary back stroke, then single back stroke combined with whatever leg strokes are possible. The frog kick is to be preferred because it makes a symmetrical effect on the pelvis and lower back. Lying on the back tends to flatten the hollow back and straighten the dorsal curve. The antigravity muscles essential to maintain the erect sitting and standing position out of water thus are developed.

The instructor who attempts to teach swimming to the cerebral palsied should realize that cerebral palsy is of central origin, and causes spasticity or rigidity of muscles, with increased reflexes. Muscle tension of these cases is increased by cold water, due to physiological stimulation via muscle and nerve. To help relax these patients they should be started with periods of practicing a float position in the water. Strokes, when begun, should be long, slow and easy. Care should be taken not to neutralize the relaxing training the cerebral patient is taking out of the water. Such patients will profit more from work in warm water.

It is obvious that all persons responsible for the handicapped—both in and out of water—have legal responsibility toward their pupils. Activities in the water, not without danger for normal persons, are, in the nature of things, more dangerous for the handicapped. Continuous alertness and care on the part of instructors, counselors and leaders are of paramount importance. The fine efforts put forth by organizations aiding the handicapped should receive every possible safeguard. Counselors and directors should have clearly in mind the actual pathological differences of polios, the cerebral palsied, and other handicapped persons in their care. They must understand physiological reactions thoroughly in order to do good rather than harm.

Enthusiasm for play response, morale boosting or other psychological values should not be emphasized at the expense of other health and development needs.

Functional Improvement Produced by Resistive Exercise of Quadriceps Muscles Affected by Poliomyelitis

Edward M. Krusen, Jr., M.D., Rochester, Minn. In ARCHIVES OF PHYSICAL MEDICINE, 30:5:271, May 1949.

The functional improvement produced by progressive resistive exercises of muscles with normal innervation has been well demonstrated by DeLorme. In that study, he introduced a method of progressive resistive exercises and the concepts of the "one repetition maximum" and of the "ten repetition maximum."

The purpose of this study was twofold: (1) to develop a program of progressive resistive exercises that could be used with patients having quadriceps muscles weakened by poliomyelitis and to study the functional changes produced by such exercise of these muscles; (2) to compare these with the functional changes of similar quadriceps muscles of patients having no supervised exercise program.

This study was conducted during the years 1946 through September 1947, at the Army and Navy General Hospital, an army center for the care of poliomyelitic patients.

(1) A program of resistive exercises for muscles affected by poliomyelitis has been proved to be valuable.

(2) On an average, muscular strength was found to increase practically as a straight line function over the period of study. This was true even after the patient had previously performed daily reeducation exercises for months.

(3) The percentage gain of strength of weaker muscles was found to be more rapid than that of stronger muscles.

(4) The absolute strength of stronger muscles was found to increase more rapidly than that of weaker muscles.

(5) No significant difference was observed between the improvement of strength of muscles on an underloading scheme of resistive exercises and of muscles on an overloading scheme.

(6) The period after onset of poliomyelitis in these late cases was found to have no influence on the improvement of muscular strength.

(7) Ability to extend the knees was found to gain with resistive exercises most rapidly at first and then more slowly.

(8) Muscles of patients having no program of supervised exercise demonstrated irregular changes; no significant improvement of strength or ability to extend the knee was observed to occur.

Preliminary Report on the Treatment of Anterior Poliomyelitis with Exercise and Curare

W. D. Paul, M.D., and O. A. Couch, Jr., M.D., Iowa City. In ARCHIVES OF PHYSICAL MEDICINE, 30:5:277, May 1949.

With the increasing interest in anterior poliomyelitis, the therapy of this disease has been hard pressed to keep pace with the newer facts derived from sound experimentation. The purposes of this preliminary report are, first, to review briefly some of the recent physiologic studies of denervation and reinnervation of muscle and, second, to give the results of a regimen of treatment which embodies certain principles obtained from animal experimentation.

Although this series is not large, a few facts can be deduced. The acute phase of poliomyelitis can be treated adequately by physical means without the use of hot packs. The most important part of the early treatment is the use of exercise or stretching to relieve tightness and pain. In this series, exercise and stretching by themselves relieved only a few patients. In many it was impossible to carry out the desired range of motion because of pain. Curare enabled the therapist to carry out exercise or stretching. Those patients treated with hot packs and stretching required nine to one hundred and fifty more days to overcome stiffness and pain. The patients with mild disease requiring only stretching were relieved in from two to ten days. The group treated by stretching, aided by curare, was relieved of stiffness and pain in from two to seventeen days, except for two patients who were not properly stretched. In one of these the stiffness was present for forty-seven days, and in the other, for six months. There is nothing in the literature to show that curare has any curative effect, and the present work supports this contention. In this series, curare was used only as an aid in carrying out the most important part of the treatment—physical therapy. Excessive doses of the drug may obliterate the resistance felt during stretching, and under these conditions stretching might result in muscle injury. Fatigue is not an important factor and does not retard recovery. The method of treatment outlined is based on physiologic concepts and is simple to execute, economical and time saving.

Progressive Resistance Exercises in Cup Arthroplasties of the Hip

Thomas L. De Lorme, M.D., and Arthur L. Watkins, M.D., Massachusetts General Hospital, Boston. In ARCHIVES OF PHYSICAL MEDICINE, 30:6:367, June 1949.

Many problems are encountered in the postoperative treatment of patients with vitallium cup arthroplasty of the hip. Their solution depends in great measure on the close cooperation of the surgeon and the physiatrist. Sufficiently different sets of mechanical and functional problems are encountered to necessitate considerable variations from the routine outlined for the average case. Along with the surgeon, the physiatrist must plan an effective and flexible exercise program to obtain maximum painless function.

The rehabilitation of the cup arthroplasty patient is divided into three phases: (1) the immediate postoperative, which includes the first four weeks; (2) the ambulatory hospital period, which starts when the patient first becomes ambulatory and extends until he is discharged (for most patients this is the eighth week); (3) the convalescent or final phase, which starts at the end of the eighth week and continues until maximum function has been obtained. The important physical therapy measures employed in each phase have been discussed.

After the first month, the patient's activities are considerably increased. Active nonresistive hip exercises are continued, and, in addition, a stationary bicycle is used for ten minutes twice daily and sometimes roller skating exercises in bed for abduction. Ambulation is initiated in a walker and graduated to crutches with minimal weight bearing, and later stair climbing. Occasionally during this period the patient may, because of joint pain or adductor muscle spasm, have difficulty in performing the hip exercises prescribed. This difficulty is frequently overcome by having him perform the exercises initially in the Hubbard tank. These underwater exercises are done three to five times weekly and usually may be stopped in two to three weeks. The average patient is

discharged from the hospital eight weeks postoperatively, to carry on the same routine at home.

The patient now encounters more complex functional problems. He is allowed to bear more and more weight, refines his gait, graduating from crutches to cane and later to no appliances at all, and, if necessary, redevelops inadequate musculature and attempts to increase joint motion. His crutch gait is checked at regular intervals and between the sixth and ninth month a patient with unilateral arthroplasty is permitted to bear full weight and to start the use of the cane in the opposite hand. A patient with bilateral operations remains on crutches for approximately one year and is then brought to full weight bearing rapidly. One or even two canes may be used during this transition period. If at the end of the third month the hip muscles have not recovered adequate strength, progressive resistance exercises are started. Jumping exercises (in place, side to side, and front to back) also may be employed for increasing coordination and strength. Eventually when the patient is allowed to discard all appliances and bear full weight, intensive gait training is started and continued until he obtains the best possible gait for the existing hip mechanics.

Several methods for exercising each hip muscle have been presented. With proper individual case analysis and therapeutic exercise equipment, optimum exercise routines for restoring joint motion and muscle power are possible even in the most complicated mechanical situations.

Progressive resistance exercises are useful in restoring hip muscle strength in these patients; they usually are started at the end of the third month but may start earlier with minimal resistance and counterbalancing.

Progressive resistance exercises are advocated four days weekly, once daily. Each exercise is carried through thirty repetitions, which are broken up into three sets of ten repetitions each. Ten Repetition Maximums and Minimums are determined weekly for measurement of progress.

Except where hindered by pain, lack of cooperation or firmly rooted habit patterns, muscle strength substantially improved in one to three months of exercise. The increased strength resulted in both objective and subjective functional improvement.

Electromyographic Study of Defects of Neuromuscular Transmission in Human Poliomyelitis

Robert Hodes, Ph.D., Philadelphia. In ARCHIVES OF NEUROLOGY AND PSYCHIATRY, 60:5:457, November 1948.

This study gives evidence that destruction of the cell bodies of somatic motor neurons is not the only alteration of the neuromuscular apparatus in poliomyelitis. Inability to maintain muscle tension during even brief movement or during brief repetitive stimulation of the motor nerve has been demonstrated in patients examined long after subsidence of the acute infection. This abnormal behavior has been shown to be due to a deficiency at the neuromyal junction. Current concepts of the pathologic process in poliomyelitis, therefore, should be broadened to include the abnormalities of peripheral structures responsible for transmission of the nerve impulse to the striated muscle.

Summary and Conclusions

1. On a series of 22 patients with chronic poliomyelitis the following observations were made:

(a) The muscle action potentials elicited by single maximal stimuli to the motor nerve of the affected muscles were smaller than those from corresponding normal muscles. The intrinsic muscles of the foot were less affected than were the muscles of the leg.

(b) The electromyogram resulting from brief maximal repetitive motor nerve stimulation (0.2 to 19 per second) in patients with chronic poliomyelitis was abnormal. The successive responses were smaller in amplitude and of shorter duration than the first response.

(c) The time course of the electrical response of the motor unit during brief voluntary effort or repetitive nerve stimulation was unchanged, although the spike amplitude declined progressively.

2. The following conclusions are drawn:

(a) The peripheral defect is due to the failure of some muscle fibers of many motor units to be excited, and probably also to the dropping out of action of entire motor units.

(b) Defective function at the neuromyal junction adequately explains the peripheral pathologic changes.

3. Neostigmine methylsulfate partially restored the abnormal electrical response; its therapeutic use is therefore suggested.

4. The clinical significance of these observations is discussed.

Tonsillectomy During Epidemic Poliomyelitis

Editorial. In JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 140:5:279, June 4, 1949.

THE JOURNAL, March 21, 1942, warned that poliomyelitis, particularly the bulbar form, greatly increased in children after tonsillectomy or adenoidectomy in epidemic areas. Reports of Stillerman, Fischer, Maxwell, Marks, Top, Aycock and Sabin were cited. Since that time avoidance of such operations during epidemics has been almost universally adopted. Recently otolaryngologists seem inclined to the belief that a causal relationship does not exist between the two and that bulbar poliomyelitis following tonsillectomy probably is purely coincidental.

However, the weight of past and recent evidence favors the existence of such a relationship. As tonsillectomy is an elective operation which rarely requires immediate surgical attention, the preventive attitude of delay is justified. Until conclusive evidence is presented that such procedures do not increase incidence of poliomyelitis the inadvisability of operation during periods of epidemic poliomyelitis should be emphasized.

Potassium in Denervated, Treated and Nontreated Muscle

Ernst Fischer, M.D., Richmond, Va. In ARCHIVES OF PHYSICAL MEDICINE, 30:6:375, June 1949.

During denervation atrophy, after a short transient increase, the potassium content of the true muscle space diminishes progressively. In this later stage of denervation atrophy, a fairly constant ratio between potassium and extractable myosin is maintained. Sodium replaces, at least partially, the lost potassium. These electrolyte changes are typical for denervation atrophy, since such changes are nearly completely absent in atrophy following tenotomy or immobilization by cast.

Appropriate daily electrical treatment of denervated muscles prevents the potassium loss or even increases the potassium concentration above normal values. In consequence, the sodium concentration also remains at normal level.

The Mole as a Possible Reservoir of Poliomyelitis: Summary

L. E. Rector, M.D., St. Louis. In ARCHIVES OF PATHOLOGY, 47:4:366, April 1949.

Several reasons why the mole might be the natural reservoir of poliomyelitis are enumerated and discussed.

Miscellaneous autopsy observations and terminal behavior traits are tabulated and discussed.

Successful passage of the virus from mole to mole and from mole to Swiss mouse and cotton rat is reported. Unsuccessful attempts to pass the virus to three monkeys is reported.

The absence of typical histopathologic lesions of poliomyelitis in the moles and the Swiss mice and cotton rats in which passage of mole brain and spinal cord was effective is discussed, and the literature concerning similar experiences of other investigators is reviewed.

Fifteen animals were employed as controls for comparative studies of autolytic changes, dietary deficiency, ability of the mole's brain to respond with mobilization of inflammatory cells, trauma of handling and reaction to foreign protein.

Primer on the Rheumatic Diseases: Part III

Prepared by a Committee of the American Rheumatism Association. In JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 139:18:1268, April 30, 1949.

Fibrositis

There is a clinically distinct pattern of rheumatism which affects primarily the nonarticular fibrous tissue, called variously fibrositis, myofibrositis, muscular rheumatism, myositis, et cetera. None of these terms is entirely suitable; "fibrositis" has become more generally used. Although this name indicates a fibrous tissue disease, it is objected to because there has been no substantiation that this is truly an inflammation as the suffix implies.

Primary fibrositis may be rather generalized or sharply localized. The more disseminated form of the illness involves the fascia, tendons and aponeuroses particularly in the back, shoulders, thighs and hands, although all other fibrous tissue may be prominently affected. Localized forms of fibrositis frequently appear as bursitis, tenosynovitis and regional fasciitis.

The cause is unknown. The same uncertainties surround the nature of this rheumatic disease as exist for rheumatoid arthritis. In some instances acute infections, trauma, unusual physical activity, fatigue and exposure to dampness and cold appear to be contributory causes. In the majority of cases even these factors cannot be incriminated; the illness seems to originate "out of a clear sky." Inherited fibrous tissue characteristics may prove to be of etiologic importance.

The outlook is relatively good. Crippling and deformities never result. The disease usually subsides or is controlled by treatment, although there are some stubborn cases. Patients should be informed that they have only a "nuisance" illness rather than a crippling disease, for they usually fear that they have arthritis and are greatly relieved to learn that their disease is relatively mild.

Treatment of fibrositis is supportive and symptomatic. Avoidance of strenuous physical activity and procurement of additional daytime rest are wise, but it is a mistake to avoid ordinary activity and moderate recreation often is advantageous. Mild exercise usually greatly aids limbering up and relieves stiffness and aching, whereas prolonged or severe exercise usually increases discomfort. Heat often relieves; massage which gradually is made rather firm usually is helpful, and planned exercise done after application of heat commonly relieves stiffness and aching. Hot packs are usually helpful for acutely painful episodes.

Localized and Special Forms of Fibrositis

Fibrous tissue irritation or inflammation may be rather localized. Symptoms and disorders of function depend on the anatomic localization. Good examples are the acute, painful stiff neck and "lumbago." Each of these painful conditions depends on irritation of the muscle sheaths, fascia, tendons and ligaments in the back. Muscle spasm often is severe. Hot fomentations and injections of procaine into the center of the irritation are apt to effect prompt relief. Antispasmodic drugs have more value in this form of fibrositis with acute muscle spasm.

Bursitis and Tendonitis.—Inflammation of a bursa is a common form of localized fibrositis. It may be caused by trauma, unusual use of the part or infection, or the cause may be unknown. Any bursae about joints may be inflamed. Commonly affected are the subacromial, olecranon, ischial, prepatellar and achilles bursae. One of the most difficult problems is fibrositis about the shoulder, which is much more frequent than arthritis of the shoulder joints and often begins with subacromial bursitis. This may begin precipitously or insidiously and may be acute or chronic.

Acute subacromial bursitis may be mild or severe. It is characterized by pain and tenderness usually localized to the subacromial region, made worse by allowing the arm to hang unsupported, by pressure over the tip of the shoulder or by movement of the shoulder in abduction and rotation. Sometimes these motions are markedly restricted by severe pain.

Treatment should be directed to relieving the pain, maintaining function and reassuring the patient as to the relatively mild nature of the disease. Local application of radiant heat or diathermy may relieve, but often aggravates pain, in which case cold usually relieves. Rest during the more acute phase followed by graded exercises to restore motion is helpful.

Shoulder-Hand Syndrome.—This interesting and incompletely understood form of nonarticular rheumatism may follow myocardial infarction or painful intrathoracic lesions, vascular accidents, trauma or other irritative lesions about the neck or upper extremity and sometimes without known cause. It is characterized by pain in the shoulder or hand, commonly in both parts; it may be unilateral or bilateral. Shoulder motion is limited by pain; the affected hand becomes edematous and painful so that it is held stiff. After weeks or months atrophy of the shoulder and hand occurs and adhesions or contractures limit motion in the affected parts. Atrophy of bone with high grade osteoporosis usually appears in the roentgenograms, which always show normal joint structure.

This syndrome is thought to be a reflex dystrophy. It needs to be differentiated from rheumatoid arthritis. Treatment with usual measures of physical therapy and analgesics often is without benefit. If stiffness of shoulder or hand results occupational and physical therapy may rehabilitate.

Manipulation and Treatment of Pain in the Chest

John McM. Mennell. In NEW ZEALAND MEDICAL JOURNAL, 47:262:586-598, December 1948.

Unless manipulation is aimed at righting a definite demonstrable wrong, then, as a method of treatment, it must fall into the category of "placebo" and justify the suspicion with which it seems to be regarded.

Manipulation means the restoration of the natural function of a joint by induced normal movement in cases where impairment of movement is the direct cause of pain which may be local or distant. It is used in treatment to restore the normal range of movement in a joint functionally impaired.

Many of those who practice manipulation so often seem insufficiently to understand the normal range of movement at a joint. Then their attempts to restore its function, with frequent subsequent deterioration of the joint, is perhaps the main reason why the medical profession tend to regard manipulation at least with suspicion. Yet, the first requisite for successful manipulation is a thorough understanding of the range of movement of a normal joint, without which one cannot even make a logical inference of abnormality.

First then, let us understand that one manipulates—not a hand or an arm, an elbow or a back—but one joint. Manipulation aims at moving one articular surface upon another. To achieve control (when manipulating), it is necessary to fix the one element and move the other; for if both parts are moved, then the movement at once becomes uncontrolled and almost certainly abnormal. To stabilize on the one hand and mobilize on the other is an inviolable rule of technic. This should prevent further damage to the joint in question as well as to a joint in the neighborhood less affected or not affected at all.

There is a normal involuntary range of movement at every synovial joint in the body, and before undertaking manipulation of any joint, one must be familiar with this range if mistakes are to be avoided.

There are still further questions to answer before passing on to the consideration of regional manipulation. The most pertinent question is whether injury to a joint shown by impaired movement can give rise to pain, either local or referred, without there being partial or complete dislocation which can be demonstrated by X-rays. A good example which shows that this is highly probable is found in the pain and stiffness which a patient experiences when a fracture such as Colles' or Pott's is taken out of plaster. The site of fracture usually is painless, but the movement of the neighboring joints may be stiff and very painful. As movement returns and the stiffness lessens so the pain goes. The joint dysfunction is attributed to a loss of elasticity and shortening of the disused ligaments. Until these ligaments are stretched with renewed use and normal function is resumed, there is likely to be pain. The duration of this pain is proportional to the efficiency of reeducation of the supporting musculature once movement has been made possible.

Let us consider the effect of uncontrolled over-movement at a normal joint. The sudden stretching of a ligament is pain-producing, for ligaments are sensitive structures. The normal reflex response to pain includes muscle contraction to spare the ligament. Hence arises muscle spasm and the effect that we describe as "locking" of the joint. Spasm is succeeded by fatigue, strain again falls on injured ligament, and a vicious circle of strain, spasm, fatigue, and strain is initiated. We do not imagine that dislocation in the demonstrable mechanical sense is always a prerequisite to "lock." Rather "locking" by muscle spasm, subluxation and mechanical dislocation form a progressive series in the causes of impaired joint function. Our problem is to break the vicious circle. This can be achieved by reverse stress perhaps by accident or by manipulation. The fact that manipulation in the absence of adhesions relieves pain and restores function instantaneously and without joint reaction can scarcely be explained otherwise. Remember, a manipulation breaking down adhesions will always produce some sort of reaction, though its degree is to some extent proportional to the skill of the manipulator.

I have tried logically to indicate that impaired joint function can and does give rise to pain both local and referred. Thus it follows that wherever there are moving synovial joints there is the possibility that they may give rise to symptoms of pain, local, diffuse or possibly simulating pain due to another cause.

It is my belief, unshaken by a recent extensive tour of medical centers in the United States, that the part played by the intervertebral disc in the causation of backache and referred segmental pain which can be traced to the back is, though on occasions incontrovertible, small and indirect. Thus will I continue to believe until there is enunciated a syndrome and plan of treatment applicable to any region of the vertebral column. I believe that the part played by the intervertebral disc is twofold; first, it can rupture and prolapse. In this case the symptoms and signs are clear and operative removal will relieve. Secondly, the disc can degenerate and thereby allow overmovement and consequent strain or locking of the interlaminar joints, in which case symptoms of pain are referred from these joints and it is to them that treatment should be directed. The concept of a concealed disc seems to me to be lacking in proof and very improbable.

I believe that the far more common cause of pain in the back is this locking of an interlaminar joint or joints. It seems to me only reasonable that synovial joints will react to stress or strain in the same way, be they in the spine or in the limbs, though in the spine changes are difficult to demonstrate and in the limbs they can be easily seen and palpated. It is unreasonable to deny the presence of synovial joint changes just because the joints are too small to palpate, difficult to move individually and almost impossible to visualize accurately by X-rays. At least it must be conceded that such changes can explain local pain and referred segmental pain can be understood.

If the inferences which I have drawn regarding the interlaminar joints where movement is impaired are justified and the impairment is producing pain, then restoration of normal movement is the logical approach and this may be effected by manipulation.

Results will be disappointing if the supporting structures of the joints concerned are ignored in after-treatment. When these supporting structures, i.e., ligaments and muscles, are inadequate to prevent recurrent joint strain and consequent recurrent joint locking, support or fusion constitutes the most rational treatment; but remember that fusion of one joint lays an added burden on its neighboring joints which themselves then become potential sources of pathological changes and consequent symptoms.

Of the conditions in which manipulation may be expected to relieve pain in the chest, the traumatic lock is the easiest to diagnose and treat. One must not always expect a history of an accidental strain during exercise for even an uncontrollable explosive sneeze when asleep may be sufficient to cause the condition. In recent cases the cause and effect are usually easy to trace. It is in cases of long standing, however, that the history may be difficult to elicit and the signs less easy to interpret. This is because after a time soft tissue changes due to prolonged protective function occur and cloud the true tissue.

Faulty posture in itself predisposes to interlaminar joint strain and pain, and it must not be forgotten that such posture may be aggravated by too rapid growth in adolescence, occupation, laziness, as well as by fatigue or disease.

Disease may produce its effect by increasing fatigue causing faulty posture or by actual joint changes. Examples may be found in the effect of adenoids, asthma, bronchitis, etc., prolonged confinement in bed, and anemia on posture. Organic joint changes would include arthritis, adolescent scoliosis, Scheuermann's disease and ankylosing spondylitis. In such conditions as these manipulation can play only a small, though a significant part in general treatment.

In any illness of an infective nature or involving prolonged rest in bed, muscle and ligament changes occur with resultant impairment of joint function. Restoration of this function by manipulation and maintenance of it by physical treatment should be a routine part of convalescence. Regular use of physical treatment (which includes manipulation if necessary), after surgical operation, especially of abdominal cases, would materially lessen the incidence of postoperative chest complications; in other words manipulation may do much to ensure that respiratory movements are full and that ventilation is complete.

I have been accused in the past of hypothetical speculation when discussing joint function and joint manipulation. So was my father before me. Such speculation of which we may be guilty is based on our personal experience now ranging over almost half a century in striving to relieve the sufferings of our patients as efficiently and economically as possible. The prescription of indefinite periods of bedrest or empirical operative measures should be condemned equally from the point of view of the patient and society.

In conclusion, it must be remembered that if the success of manipulation depends on how it is done, it depends no less on why and when it is done. Empirical manipulation is doomed to failure.

Methods of Clinical Study and Evaluation of Therapeutic Agents in Poliomyelitis

Report of the Therapeutic Trials Committee of the Council on Pharmacy and Chemistry. In JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 140:6:534, June 11, 1949.

(Early in 1947, the Therapeutic Trials Committee was asked by the National Foundation for Infantile Paralysis to investigate the feasibility of and methods available for evaluating the effect of moist heat in the treatment of poliomyelitis. A subcommittee was formed which, together with a number of consultants, studied this problem for nearly two years. Although a report was rendered to the National Foundation outlining in detail the methods which, in the opinion of the subcommittee and its consultants, should be used in evaluating the effect of this modality in poliomyelitis, certain principles applicable to the evaluation of any agent in this disease became evident from these studies. It was thought desirable to present these principles in the form of a report in the hope that they will prove useful to any who may be charged with the task of testing the effectiveness of some new agent in this disease.—Walton Van Winkle, Jr., M.D., Secretary.)

Before selecting methods for the evaluation of any agent in the treatment of a disease, the ultimate effect that is desired must be clearly in mind. In the case of poliomyelitis, four possible results of therapy may be produced by an effective agent: (1) alleviation of symptoms during the acute phase, such as pain, muscle "stiffness" or "spasm"; (2) prevention of paralysis; (3) prevention of death, and (4) more complete restoration of full muscular function. In this report, attention will be focused on the first two and the last of these effects, since death from poliomyelitis results from specific localization of the disease, either bulbar or affecting the innervation of the respiratory muscles.

The basic problem in evaluating any therapeutic agent in a disease such as poliomyelitis is to overcome or diminish the errors introduced by the wide variations in the spontaneous course of the disease and the inability to predict the probable outcome of a given case when seen early in the disease at the time therapeutic measures are instituted. In order to understand the reasons for the recommendations contained in this report, it is necessary to appreciate these variables, and, therefore, a brief discussion of the more important ones is presented.

Treatment of Patients.—It is of the utmost importance that both the test group and the control group of patients receive identical treatment with the one exception that the patients in the test group have added to their treatment the agent under investigation. Furthermore, it is important that the effects of the agent being tested be not confused with the effects of other therapeutic procedures. This requirement imposes certain technical and psychologic difficulties which merit discussion.

No form of therapy of poliomyelitis in use today, except such procedures as tracheotomy or use of a respirator in certain forms of the disease, has been conclusively proved to be superior in end results to those observed in patients with no treatment. Even the value of tracheotomy is disputed. This, of course, does not refer to orthopedic procedures to correct deformity. Also, this does not mean that certain forms of therapy may not produce superior results, but the critical test has never been performed in an adequate manner. There is not, therefore, a generally accepted basic treatment for the disease. For instance, hot pack therapy as advocated by Sister Kenny as part of her treatment is used in comparatively few places, although many modifications are in use. Physical therapy procedures have not been standardized and vary markedly from clinic to clinic.

Unfortunately the public has become aware of certain procedures under the name of their original protagonist without knowing precisely of what those procedures consist. Public opinion, in a number of instances, has forced the adoption of costly treatment procedures against the better judgment of the responsible physicians and without adequate proof that such procedures are advantageous or superior to others advocated by more rational minds.

It seems generally agreed that certain physical therapy procedures should be instituted early in the treatment of patients with poliomyelitis. The nature and extent of these procedures vary considerably among hospitals, and it is important that before embarking on a collaborative investigation agreement be reached among all participants regarding the detailed methods to be used and the frequency and duration of application to cases. Furthermore, physical therapy is applied by physical therapists whose training and experience vary in different institutions. No written directions can be prepared which would be wholly satisfactory for the standardization of such procedures. It should be apparent that such standardization is important in order to minimize a major variable which might affect the results of the investigation.

The committee believes that the most satisfactory method of achieving standardization of physical therapy procedures to be used in treating patients included in a collaborative program would be to have the principal physical therapists from each collaborating institution brought together at one institution equipped to teach them the procedures agreed on by the investigators. The suggested training period for these physical therapists

should be four to six weeks in duration and the training should be given not too far in advance of the contemplated time of starting the investigation. Training should be given under the direction of a competent physiatrist or orthopedic surgeon and a qualified physical therapist.

In order to insure that the standardization of procedures is maintained throughout the investigation, the personnel responsible for giving the original training should visit the collaborating institutions at intervals during the investigation, observe the procedures in operation and correct any departures from agreed technics.

The duration of observation of patients included in an investigative program should be sufficiently long for any spontaneous recovery to become fully apparent. In general, there seems to be no evidence that natural recovery extends beyond sixteen to eighteen months after the onset, and it is suggested that final examination of each patient be made eighteen months after the onset of the disease.

Evaluation of Results

In a disease such as poliomyelitis the end results in a given patient cannot be appraised without an accurate knowledge of the extent of the original disability and the progress of the recovery. In the evaluation of the extent of the disease and the degree of residual paralysis at the end of observation, reliance has to be placed on manual muscle examination. Unfortunately, manual muscle examination is not a procedure which lends itself readily to quantitative evaluation and the factor of judgment of the observer plays an important role in the interpretation of results. Furthermore, some muscles can be examined and their functional capacity determined more readily and more accurately than others. Poliomyelitis frequently, if not always, is selective with respect to the muscles affected, and it is seldom, if ever, possible to find two patients with the same muscles involved to exactly the same degree. It is not possible, therefore, to design an experiment wherein one patient may be paired with another for purposes of comparison.

Muscle Examinations.—The first muscle examination of each patient should be made as early in the disease as possible. It is probably not feasible to make an adequate examination during the acute febrile stage, but a complete examination should be commenced within forty-eight hours after the fever has subsided and, depending on the condition of the patient, carried out in piecemeal fashion over a period of several days. Examinations should then be made at monthly intervals after the onset of the disease during the first six months, at two month intervals during the second six months and at the fifteenth and eighteenth month after the onset of the disease.

The methods used should permit a semiquantitative grading of the functional capacity of the muscle.

In making muscle examinations, particularly early in the disease, it is important to distinguish between paralysis and spasm. Furthermore, diminution of motion or pseudoparalysis due to pain must be distinguished from actual paralysis due to anterior horn cell damage. Therefore, there is need for repeated examinations and separate reporting of results in cases with and without pain.

Evaluation of Pain and Tightness.—Neither pain nor tightness lends itself to quantitative determination. The judgment of the observers will have to be relied on, and too much consideration should not be given to changes in these symptoms, unless the changes are large and dramatic.

The Committee recommends that in any collaborative study of poliomyelitis in which the evaluation depends on the results of muscle examinations a team of muscle examiners be established and trained in a uniform manner, and that they travel among the various collaborating institutions, examining all patients.

The factors which enter into the final evaluation are the following: (1) rapidity of improvement in paralysis as shown by repeated muscle examinations; (2) the residual disability as revealed by muscle examination at the end of eighteen months after the onset of the disease; (3) the comparative incidence of paralysis in test and control groups for those first admitted in the preparalytic stage; (4) residual weakness; (5) muscle spasm with residual shortening and fibrosis; (6) atrophy; (7) evidence of vasomotor disturbances including cyanosis of extremities, thrombophlebitis, etc.; (8) total disability (this takes into account differences in importance of various muscle groups); (9) effects of therapy on pain and tightness.

It seems advisable, therefore, to recommend that the evaluation of results be performed on all patients by the same persons. For this purpose, a team of competent experts should be formed, whose duty would be to visit each institution, examine each patient in both the control and test groups at the end of the period of treatment and observation. At the time of examination of the patient these experts should not know whether the patient is in the test group or in the control group, so as to avoid any influence of unconscious bias on the judgment of the examiner.

After all data have been collected, the task of evaluating them must be performed jointly by the participating investigators, evaluating group, and the statistician. The data which should be available for study are:

1. The results of the repeated muscle examinations on the patients.
2. The appraisal of the investigators as to the amount of pain, tenderness and tightness at various stages of the diseases in the patients.
3. The comparative incidence of paralysis in those patients admitted in the preparalytic stage.
4. The results of the examinations of the evaluating group with respect to:
   (a) Residual disability of the patients at the end of observation.
   (b) Residual weakness.
   (c) Atrophy.
   (d) Evidence of vasomotor disturbances.
   (e) Total disability.

Summary

Poliomyelitis is a disease characterized by extreme variability in its course and in the degree of disability produced in victims.

Among the variables which must be controlled in any investigation of the efficacy of a therapeutic agent in this disease are the following: variations in diagnostic criteria, unpredictability of the course of the disease, unpredictability of outcome, effects of different immunologic types of the virus, effects of climatic and geographic variations, age distribution of cases, variations in technics of applying treatment and variations in measuring and judging extent of paralysis, deformity and disability.

Because of the many variables involved, it is necessary to observe a large number of patients in order to evaluate the effects of any therapeutic regimen in poliomyelitis; this, then, involves a collaborative effort of a number of institutions.

The methods proposed for investigation and evaluation involve acceptance of cases according to predetermined

diagnostic criteria, classification of cases according to the stage of the disease on admission, establishment of control and test groups within each classification and assigning cases to these groups in a completely random manner, administering identical treatment to both the test and control groups with the single exception of the variant to be studied, administering treatment by physical therapists pretrained in uniform procedures, following the progress of each patient by semiquantitative standardized muscle examinations administered by a traveling group of specially trained examiners, evaluation of results in each patient by a group of experts especially chosen for this purpose and weighing of the results according to their reliability and importance and subjecting them to statistical analysis to determine the probable significance of any observed differences.

Early Ambulation in Obstetrics and Gynecologic Cases

R. de Soldenhoff. In LANCET, 2:955, Dec. 18, 1948. Abstracted in JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 140:3:362, May 21, 1949.

According to de Soldenhoff there is considerable variation in what is meant by early ambulation. In the United States it means getting out of bed in the first twenty-four hours after operation or delivery. In some parts of Europe the patient walks back from the theater or delivery room. To the author early ambulation means to be out of bed on the third postnatal or postoperative day, though occasionally he has followed Liethauser's technic of making the patient stand by the bedside and cough three or four times within eight hours of operation, particularly where pulmonary complications may be expected. The results of a year's trial of such early ambulation are here compared with those of a previous year in a survey of 2,735 admissions, with 1,878 deliveries. The author found that in cases of cesarean section, myomectomy and other operations that the psychologic response to early rising is most pronounced, particularly in cases of repeat cesarean section in women who previously had been fourteen days in bed. The patients appear to be impressed by their rapid return to normality. Early rising is particularly valuable after an abdominal operation, because the loss of muscular tone is more rapid and the interference with respiration more complete than in any other type of case, and recumbency reduces the vital capacity. The author is convinced that early ambulation does no immediate harm either to obstetric or to gynecologic patients, and it certainly allows a much bigger turnover of patients in hospital. It is hard on the staff, but a physical therapist saves the nurses much work by encouraging patients in their exercises.

Kinesiologic Electromyography: III: The Deltoid

Leonard J. Yamshon, M.D., Baruch Fellow in Physical Medicine, Columbia University, and William Bierman, M.D., Assistant Clinical Professor of Medicine, Columbia University, New York. In ARCHIVES OF PHYSICAL MEDICINE, 30:5:286, May 1949.

The procedure used for recording action potentials from the deltoid was the same as that described for determination of muscle functions of the biceps brachii and of the trapezius. Electromyograms were recorded from the anterior, medial and posterior portions of the deltoid. Ten different normal subjects were used. Action potentials were obtained from the muscle while the arm was moved when the subject was in the erect and in the horizontal positions. No external resistance was applied. As in previous reports, grading of potentials was placed on a comparative qualitative basis.

(1) The anterior, middle and posterior portions of the deltoid take part in forward flexion, abduction and hyperextension of the arm.

(2) In the erect position, the microvoltage of potentials produced by the contraction of the deltoid is greater when the motions of the arm are performed above the horizontal plane than when these motions are carried out below this plane.

(3) The anterior portion of the deltoid acts as an internal rotator of the arm.

(4) The posterior portion of the deltoid acts as an external rotator.

(5) Movements of the arm in adduction from the frontal toward the sagittal plane is accompanied with evidence of activity in the anterior deltoid and in the posterior deltoid on the reverse motion.

Instruction Courses

Editorial. In ARCHIVES OF PHYSICAL MEDICINE, 30:6: 409, June 1949.

In the past there have been many instruction courses, held at the Congress and elsewhere, in physical medicine and physical therapy. Before the field of physical medicine developed into a full-fledged specialty, these courses were designed for the physician who had an interest in physical medicine and who wished to learn more relative to the indications and procedures used, and to assist in further training of technicians. In most instances, these physicians did not consider themselves specialists. At that time, many of the physical therapists were more aware of the technics used than were some of the physicians. Even at present, many therapists are asked to use their own judgment in the treatment of patients by physical procedures. Because of the interest of the therapist in instruction, the scarcity of physicians who practice physical medicine as a specialty, and the tendency on the part of the physician to delegate most of the practice of physical medicine to the judgment of the therapist, instruction courses have been poorly attended by physicians and well attended by therapists. This has made it somewhat difficult to organize courses on a level which is commensurate with the education and professional training of both groups. The tendency has been to organize the courses on a level which would be of interest to the therapist, rather than to the physician.

There are a number of medical centers, over the country, which have made very earnest attempts to conduct instruction courses in physical medicine. These courses have been designed to attract physicians primarily. However, even in many of these, there has been a tendency for the courses to be poorly attended by the physicians, and well attended by technical personnel. This undoubtedly is largely the fault of physicians, who tend to send their technical assistants, because they do not realize the need for them to know more concerning the field than do the technical aides. In addition, it saves time for them to send therapists, rather than go themselves. By doing this, the physicians are only fostering the already too great tendency to make the therapist use medical judgment in the treatment of patients.

It is no more logical to assume that the medical aspects of physical medicine can be learned and carried on adequately by having the physical therapist keep up with advances in the field by attending instruction courses, than it would be for the roentgenologist to send his

technical aides to such courses and expect to remain in touch with the field of roentgenology. This does not mean that the physical therapist is not an important person in the practice of this branch of medicine. She should be instructed likewise, but on her level; she should not be expected to be an authority on the whole field.

It has been shown in a few instances that where the combined courses (for physical therapists and physicians) were poorly attended by physicians, when the courses were changed to those for physicians only they were relatively better attended by medical men.

In view of some of the difficulties mentioned, it might be well to consider having yearly courses conducted in different parts of the country, and that these courses be divided into those designed for the physiatrist, for the general practitioner, and for the therapist, rather than trying to conduct one general course to attract all groups.

Osteoarthritis of the Hip: Treatment

Alex Robinson, M.D., C.M., Banff Clinic, Banff, Alta. In THE CANADIAN MEDICAL ASSOCIATION JOURNAL, 60:2:161, February 1949.

Aftertreatment is of great importance. A routine is established whereby the joint is daily put through its full range of movement. End-of-the-bed traction and deep pool baths are started at once, while flexion deformity of the hip, so commonly present, is combated by instructing the patient in a method of hyperextension—leaning back against the side of the bed and allowing the feet to dangle. Once a week or oftener the hip capsule is injected with 20 c.c. of ½ per cent procaine, as described by Fletcher, using a Luer-Lok syringe so that this may be done under pressure. This relieves the pain and allows a greater range of movement during the routine manipulation which follows. Sciatic pain that is present also may be relieved by procaine directly into the nerve. Any areas of fibrositis are similarly injected. Infiltration of tense adductor muscles is useful in selected cases to diminish muscle spasm.

On discharge from hospital, the patient is instructed to set up a traction apparatus for himself when he goes home, and to put his hip through a full range of movement daily. He is advised to wear rubber heels (to minimize jarring), keep his weight within normal limits, and to walk erect. Unnecessary exposure is to be avoided and he should dress warmly. A daily rest period is advocated, preferably both morning and afternoon, as well as some daily exercise. If discomfort or stiffness of more than an hour's duration follows the exercise, it should be reduced.

An Abduction Exercise Splint for the Shoulder

Edward J. Coughlin, Jr., M.D., Williamstown, Massachusetts. In THE JOURNAL OF BONE AND JOINT SURGERY, 31-A:2:438, April 1949.

In many lesions in and around the shoulder joint, abduction within certain limits is greatly to be desired. Unfortunately, this has not been possible in many instances without keeping the patient confined to bed in some form of balanced suspension. From an economic point of view, this is burdensome; and at the present time, with hospital beds at a premium, it is impossible. In an attempt to provide abduction exercises without hospitalization, the ambulatory splint was devised.

The splint consists of a U-shaped metal bar which is strapped to the body by means of cross straps, and an axillary ring on the opposite side. In addition, there is a shoulder strap on the affected side to prevent the shoulder from being elevated during the period of abduction. The principle underlying the splint is very simple: Extension of the elbow shortens the rope from the elbow to the pulley, and by means of the sling around the elbow, the arm is brought into abduction. The degree of abduction to be obtained may be varied by shortening or lengthening the rope extending from the elbow sling to the hand grip.

Rehabilitation

Howard A. Rusk, M.D., New York. In JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 140:3:286, May 21, 1949.

To the physician the term "rehabilitation" has long connoted "the restoration of the handicapped to the fullest physical, mental, social, vocational and economic usefulness of which they are capable." In general usage, however, the term itself, during the past few years, has lost much of its significance, for it has been used to describe everything from correctional programs in modern penal institutions to the social and economic rebuilding of war devastated countries. With the developing emphasis placed on the processes of restoring handicapped workers, a new term has arisen which describes such processes more aptly and with more virility. That term is "the third phase of medical care."

The practice of rehabilitation for any physician begins with the belief in the basic philosophy that the physician's responsibility does not end when the acute illness is ended or surgery is completed; it ends only when the patient is retrained to live and work with what is left. This basic concept of the physician's responsibility can be achieved only if rehabilitation is considered an integral part of medical service. Any program of rehabilitation is only as sound as the basic medical service of which it is a part. The diagnosis and prognosis must be accurate, for it is on them that the feasibility of retraining is determined.

In addition to the general diagnostic studies, the medical evaluation of the orthopedically handicapped must include muscle tests, determination of joint range of motion and tests for the inherent needs in daily living. In the rehabilitation service at Bellevue Hospital, a check list of ninety-six items is used to determine these factors. They include: (1) bed activities, such as moving from place to place in bed, and the ability to sit erect; (2) toilet activities; (3) eating and drinking; (4) the ability to dress and undress, such as tying shoe laces, manipulating buttons, zippers and other fasteners, and applying and removing braces; (5) hand activities—for example, winding a watch, striking a match and using various door knobs and latches; (7) wheel chair activities, getting from the bed to the wheel chair, the wheel chair to bed, and in and out of the bathtub, and (8) elevation activities, which include the needed abilities for walking, climbing and traveling.

Regardless of the type of disability, the responsibility of the physician to his patient cannot end when the acute injury has been cared for. It ends only when the physician has taken the responsibility for seeing that proper referral has been made to those agencies and institutions which are equipped to rehabilitate and retrain the patient with a residual physical disability. The physician who fails to see that those patients under his care receive the full benefits of modern methods of medical rehabilitation and retraining is in the same category as the physician who still persists in using dietary restriction alone in the management of diabetes, when insulin is available, for medical care is not complete until the patient has been trained to live and work with what he has left.

Missile Wounds Involving Bone

Ronald Furlong, Late Brigadier, Consulting Orthopedic Surgeon to the Army, Assistant Orthopedic Surgeon, St. Thomas Hospital, and John M. P. Clark, Late Major R.A.M.C., Assistant Orthopedic Surgeon, Leeds General Infirmary. In THE BRITISH JOURNAL OF SURGERY, 143:2:291, January 1949.

After healing of the wound every effort must be directed toward rehabilitating the patient during the period when the fracture is uniting. The patient's desire to become mobile and self-supporting gradually evaporates during prolonged immobilization, so that his period of inactivity must be reduced to a minimum. During the war all general hospitals were supplied with teams of physical therapists, physical training instructors, occupational therapists, and rehabilitation officers all calculated to make the patient's convalescence active both physically and mentally, in order that he might overcome his injury and any residual disability. The surgeon's duty, therefore, is to free the patient from the encumbrance of splintage as soon as is compatible with the need for adequate fixation until union is achieved and to make any necessary splintage as small a handicap as possible. It was the aim in overseas theaters to make every patient ambulatory, if practicable, before repatriation, so that he could enjoy —to him a matter of prime importance—reunion with his family.

TREATMENT OF INDIVIDUAL FRACTURES

Femur

Rehabilitation—All fractures of the femur were kept under treatment at overseas centers (except in Northern Europe) for three months, at the end of which period the majority of them were united, the patients being ambulant with the aid of crutches. Where union was sound no form of splint was used; nonweightbearing exercises and crutches for walking became the routine. Many of the patients were capable of flexion of the knee to 90 degrees when relieved from traction; by avoiding the use of a calliper full knee movement was quickly obtained and muscle power was greatly increased. In those patients in whom union was considered not very firm the Charnley adjustable calliper was fitted. This proved to be an admirable instrument and could be quickly applied and adjusted to the limb of any patient. Vigorous active exercises were continued during convalescence until clinical and radiographic examinations showed that the fracture was consolidated. The patient was allowed to go entirely free. Manipulation of the knee under anesthesia may be required for some patients in order to complete the passive range of movement at the knee, but this should be done much later when it is felt that activity and weightbearing are unlikely to yield any further improvement.

The Foot

Rehabilitation—Active nonweightbearing movements for the knee and hip of the affected leg must be started right away and must be used for the ankle and foot as soon as plaster restriction has been removed. Much disturbance in circulation follows the injury and the wearing of a plaster, and unless some form of supporting bandage is worn for many weeks after the removal of the plaster, walking is embarrassed by chronic edema which is difficult to control. Men who have worn a plaster in which the foot has been immobilized in any degree of equinus have difficulty in restoring the range of dorsiflexion at the ankle, with a consequent interruption in the smoothness of their gait, while those who develop bad walking habits through the use of the Bohler walking iron require prolonged training to restore a normal progression.

Shoulder and Arm

Rehabilitation—This begins immediately after primary surgery and is initially directed to the hand. Edema, if allowed to persist, and restriction by splintage will both produce stiffness of the hand and fingers—which will remain permanently or only yield gradually and incompletely after months of treatment. The hand must be supported in the position of functional rest both when the patient is in bed and when he is ambulatory. Purposeful activity, with or without active splintage, is the key to the rehabilitation of the hand, and if this is started early and persisted in there is small likelihood of stiffness developing even in the presence of a peripheral nerve lesion. A stiff hand following an open fracture of the arm is a mute condemnation of the treatment that the patient received.

Summary

1. The general principles of primary surgery for open fractures of the extremities are outlined.
2. Primary splintage is required for immobilization and not to maintain accurate reduction.
3. The role of chemotherapy is considered.
4. The closure of open fractures in definitive treatment by delayed primary suture, secondary suture, or skin-graft is regarded as a prime necessity.
5. The complications of open fractures are discussed.
6. The authors' routine treatment of individual fractures is described.
7. The treatment of the soft parts is given equal prominence to that of the fracture and the importance of early mobility and rehabilitation is stressed.

The Coordinating Council for Cerebral Palsy in New York City

William Benham Snow, M.D., New York. In ARCHIVES OF PHYSICAL MEDICINE, 30:6:405, June 1949.

This is the first report of the activities of the Coordinating Council for Cerebral Palsy in New York City. Our work has only begun, but good and substantial headway has been made in the short period the organization has existed. The problem of cerebral palsy is nationwide and at present much in the public eye. We tender this report at this time as a stimulus to similar efforts in other communities.

Well trained and experienced workers in this field are very scarce. It is felt, however, that an extensive special training need not be an absolute prerequisite for therapists, social workers and other personnel, with the exception of the physician in charge. There are many workers who have a real aptitude in this field and could be quickly trained on the job under good guidance. It is felt that a basic training course could be given to therapists, social workers and other persons in order to equip them for a place in the program. A six weeks' concentrated course including didactic lectures and supervised work in already operating clinics would equip a capable person to begin work in a clinic.

Physician in charge of clinic might be a pediatrician, neurologist, specialist in physical medicine or rehabilitation. He should have a strong interest in and a broad knowledge of the problem.

Physical therapists.—A therapist can handle approximately 8 to 10 patients a day. Physical therapists, in ad-

dition to their regular training, should have at least six weeks' special training at an established cerebral palsy clinic.

Occupational therapists.—The number of occupational therapists required would be approximately one-half the number of physical therapists and would depend upon the demand of the clinic.

Brachial Neuritis Due to Cervical Intervertebral Disk Lesions

E. Walker. In GEORGIA MEDICAL ASSOCIATION JOURNAL, 38:1, January 1949. Abstracted in JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 140:6:565, June 11, 1949.

According to Walker rupture or herniation of a cervical intervertebral disk is the usual cause of pain which extends from the lower cervical portion of the spine into the upper extremity. The clinical picture is that of so-called brachial neuritis with pain involving one of the lower cervical nerve roots. The patient usually complains of pain over the suprascapular region, often radiating into the shoulder region and distally down the arm. If the nerve root is sufficiently damaged, there may be reflex or sensory changes, and these neurologic findings will be of considerable importance in determining which nerve root is involved and which disk is ruptured. Roentgen studies of the cervical part of the spine will aid in the diagnosis. In most cases the pain subsides spontaneously within a few days of conservative treatment consisting of rest and immobilization. Symptomatic therapy is given for the relief of pain. In the more persistent cases a cervical brace or even head traction may be useful. When the pain is severe and persists, surgical decompression of the nerve root is the treatment of choice.

For the Physical Therapist: The Scope for a Mobile Physical Therapy Service

Janet Dennison, M.C.S.P. In THE BRITISH JOURNAL OF PHYSICAL MEDICINE, 12:2:53, March-April 1949.

The present age is essentially a "mobile" one, that is to say, a time when many facilities hitherto found only at centers can be put into a car or van and transported to the homes of those who cannot reach a center. We heard during World War II of mobile dressing stations, mobile canteens, and mobile guns, and we now have mobile kitchens, shops and "squads" of one kind and another, so that it has seemed almost inevitable that physical therapy also should be made mobile.

The Patients to be Visited—Of all the medical auxiliary services, physical therapy seems to be one of the most essential to be mobilized, for it may be needed (1) by those temporarily bedridden, but not necessarily requiring to be in a hospital; (2) by those not bedridden, but for whom a journey would negate the benefit of treatment; (3) by those whose treatment must be frequent and last over a long period, and who cannot afford either the cost of regular transport or the loss of working time by an able-bodied escort; (4) by those who, by reason of their age, cannot go to seek their treatment, and who must be left to join the vast number of "chronic sick" unless help is taken to them.

There are, of course, physical therapists with private cars carrying portable apparatus, able to visit patients who can pay the cost of their treatment; but because modern apparatus is costly, this cannot be brought within the means of all, and there has seemed to be a need for an assisted service to make domiciliary treatment universally available. It was to fill this need that the Mobile Physical Therapy Service was formed, in July 1946, under the chairmanship of Lord Horder.

To those who doubt the economic value of a service which can provide treatment for 8 or 10 patients in a day, compared with the 20 who might be treated in a hospital department, I would stress that patients visited by mobile vans should be only those who could not, by any means whatsoever, reach a hospital department—that is to say, those who must otherwise be entirely neglected.

If treatment can be given in all these cases, it will be found to shorten sickness time, free hospital beds more quickly than is now possible, and reduce very greatly—if not cause to disappear—the demand of the "chronic sick" for admission to institutions. It is no uncommon result of a physical therapist's visit to one of these homes for patients who have been bedridden for many years to regain their independence and be able to lead quiet normal home lives. If this can happen to patients already classified as bedridden, it is surely infinitely more possible, by giving treatment earlier, to prevent this classification from ever being made at all.

Aspects of Physical Reconditioning

Marcus J. Stewart, M.D., Memphis, Tennessee. In THE JOURNAL OF BONE AND JOINT SURGERY, 31-A:2:394, April 1949.

Conservation of manpower and the gainful existence of the individual following orthopedic injuries and disease are attained not so much by the restoration of function as by continually preserving function. Thus, in the initial treatment of fractures, reduction of the bone fragments should not be paramount but rather the decision as to the most rapid method of restoring the whole individual to a functioning, economically solvent capacity. Surgical repair and treatment should be based on a program which will adequately immobilize the injured part, and at the same time maintain good tissue turgor and a properly functioning vascular tree, and allow early active exercise. In operative cases, it is as much the surgeon's responsibility to impress upon the patient the importance of postoperative care and proper muscle re-education as it is to employ good surgical technic. Each patient who faces more than a few days of convalescence should be given a detailed schedule of active rehabilitation—especially a program of remedial exercises.

The ideal stepping stones to physical reconditioning of the patient are:

1. An enthusiastic desire on the part of the patient and the physician to attain and maintain the best possible function of the affected part and of the whole body.
2. The acceptance of a program of early, active non-weightbearing and weight-resisting exercises, religiously executed.
3. Intelligent and systematic deep breathing, with conscientious maintenance of good posture.
4. The application of heat, massage, and special apparatus in selected cases.

The physician and the physical instructor must gain the patient's complete confidence and cooperation; the keynotes should be patience, sincerity, enthusiasm and optimism. The patient should be taught three important phases of muscle rehabilitation: (1) contracting, (2) sustained contracture, and (3) complete relaxation. The objective should be what is commonly referred to as dynamic physical reconditioning, or dealing with the specific therapeutic need of the individual, in contrast to physical reconditioning, which refers to general calisthenics.

Recent Advances in Physical Therapy in the United Kingdom

Basil Kiernander, D. Phys. Med., Lecturer in Physical Medicine, Institute of Child Health and Institute of Laryngology and Otology, University of London, London, England. In ARCHIVES OF PHYSICAL MEDICINE, 30:5:296, May 1949.

As far as physical medicine departments are concerned, most of them have changed materially in the type of work which they do compared with their work before the war. While patients with recoverable injuries and diseases, of course, have been treated for many years in physical medicine departments, there was a great tendency in many hospitals for the departments to be overcrowded with patients with various incurable conditions for whom only palliative work could be done. This work tended to crowd out the remedial work for patients with recoverable conditions. Today the picture has changed materially, and the patients who form the majority treated in the departments are those for whom intensive physical therapy applied daily, as opposed to less frequent treatment, can provide a rapid means to functional recovery.

The old tendency toward passive therapy has passed, and, in most departments today, active movements are the primary therapeutic measure employed and all other measures are ancillary to the use of remedial exercises. The frequency of attendance has been increased in the same way as it has in service hospitals, with correspondingly shortened periods of recovery.

There also has been a tendency to set up more physical medicine departments with supervision by physical medicine specialists. In the treatment of certain special conditions, such as cerebral palsy, residential institutions have been started with very satisfactory results on lines corresponding to those in the United States, the great work of which has been recognized in the United Kingdom.

The Council on Physical Medicine Becomes the Council on Physical Medicine and Rehabilitation

Report of the Council. In JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 140:3:292, May 21, 1949.

After mature deliberation, the Council on Physical Medicine has recommended to the Board of Trustees of the American Medical Association that, owing to the inevitable march of progress and the expansion of its interests into the field of rehabilitation, its name be changed once more and that hereafter it be designated as "the Council on Physical Medicine and Rehabilitation." It has been concluded that this is a fully logical and in fact highly desirable change, which would indicate more specifically the present status of the expanding field of medical activity with which the Council is concerned.

Early Rising After Surgical Operation

Editorial. In JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 140:2:227, May 14, 1949.

Early rising after operation was first advocated in this country by Emil Ries of Chicago as early as 1899. Patients of Doctor Ries were made to sit in a chair for ten minutes on the second postoperative day regardless of the extent of the surgical procedure. The method was adopted somewhat later by Dr. H. M. Richter, also of Chicago, by the Mayos and by numerous other American surgeons. The Germans usually credit Heinrich Braun with priority in this field. At the thirty-seventh congress of the German Surgical Society in 1908 Kümmel and Krönig spoke enthusiastically of the method. A further impetus to early postoperative ambulation in this country was given by the report of Leithauser and Bergo, in which the authors stated that pulmonary or vascular complications, dehiscence, hernia, thrombophlebitis or other serious complications failed to occur in a series of 436 operative cases. The nature of the intervention in 330 cases of this series was a type considered minor, and in only 66 cases reported by them was the operation of the type considered major.

The advocates of early rising stressed, as pointed out in an early editorial in THE JOURNAL, the beneficial influence of the method on the pulmonary and intestinal functions; also on the function of micturition as well as on the mental state of the patient.

A recent report by Blodgett from Peter Bent Brigham Hospital offers an evaluation of both advantages and limitations of the method. Early rising has been practiced in this hospital since 1942. Noted among the advantages was a more rapid return to normal strength and activity and a better outlook and morale in the patient.

Physical Medicine in Canada

T. H. Coffey, M.D., Professor of Physical Medicine, University of Western Ontario, London, Ontario; Adviser in Physical Medicine to Department of Veterans' Affairs of Canada; Consultant in Physical Medicine, Victoria Hospital, London, Ontario; Consultant to School of Physical Education, University of Western Ontario, London, Ontario. In THE BRITISH JOURNAL OF PHYSICAL MEDICINE, 12:2:30, March-April 1949.

Before World War II

Previous to World War II, physical medicine existed on a small scale in various Canadian general hospitals, and on a higher plane in the centers under the Workmen's Compensation Boards of Ontario and Alberta. The usual hospital department of physical medicine consisted of a Physical Therapy Department or an Occupational Therapy Department or of both, but very few hospitals or centers were able to boast of both these installations.

War-time Developments—The war years 1939-45 saw the greatest advances made in physical medicine in Canada, and also among the Canadian troops in the United Kingdom and on the European Continent.

Post-war Developments—Developments learned during the war have benefited civilians and ex-Servicemen alike, and the technics have been carried on by the Department of Veterans' Affairs, by Workmen's Compensation Boards, and in an ever-increasing number of civilian hospitals throughout Canada, planned exactly as they were in the States.

Probably the outstanding advance in physical medicine during these post-war years has been the formulation and acceptance of plans for the certification of Specialists in Physical Medicine by the Royal College of Physicians and Surgeons of Canada.

Another of the major advances in the field of physical medicine has been the establishment, in 1946, of a Chair in Physical Medicine in the University of Western Ontario, the first in the history of Canadian Medical Schools. Physical medicine is now being taught to undergraduates in the University. The importance of the subject cannot be too strongly stressed, and it is hoped that other universities will follow the lead of Western Ontario in this field. At the present time, students in the final and semifinal years are receiving instruction in

physical medicine. When the medical curriculum is reorganized to its pre-war status, it is hoped that the third year will also be included.

A research program has been instituted by the Department of Physical Medicine in the University of Western Ontario. It is still in its infancy, but it gives promise of obtaining useful information, particularly about diseases of old-age groups.

The introduction of remedial physical training by qualified physical training instructors has been used to a great extent in the Department of Veterans' Affairs Hospitals and in its Health and Occupational Centers. This innovation was made during the war, because of the shortage of trained physical therapists, and the work done showed the benefits of properly prescribed physical training. It is considered that more intensive and advanced training is necessary for these instructors.

The training course of physical therapists and occupational therapists has been increased by an extra year in the Universities of Toronto and McGill. Physical therapists are now required to undergo a three-year training course, instead of the two years formerly required.

In addition to physical therapy, occupational therapy and remedial physical training, extensive workshops also were set up at the Health and Occupational Centers. The object of these workshops was to assess the vocational aptitudes of the patients and to make the best use of any information that might have been gleaned from this experiment. Accurate statistics are not available, but it is believed that they did serve this purpose. In the peace-time organization, except in a neuropsychiatric or tuberculosis program, the place of these expensive workshops is debatable.

The Workmen's Compensation Board of Ontario has opened a large Center at Matlon (a former Air Force and Department of Veterans' Affairs center) as a convalescent center. This establishment has over 400 patients and has facilities for both bed and ambulatory care. It is a distinct advance from the former small clinic sponsored by the Board of Toronto. The Province of British Columbia Workmen's Compensation Board has a Rehabilitation Center but no living facilities. Patients attend classes in the morning and in the afternoon, and are placed in groups according to their disability.

Alberta has a similar arrangement in operation. In addition 50 beds in the hospital at Banff are made available for bed patients, and there are the facilities of the mineral-water springs at Banff for use in treatment.

Sunlight and Skin Cancer in Kenya

F. Piers. In BRITISH JOURNAL OF DERMATOLOGY AND SYPHILIS, 60:315, October 1948. Abstracted in JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 139: 11:747, March 12, 1949.

According to Piers the concept that frequent and prolonged exposure to sunlight may lead to the development of cutaneous cancer in man has received considerable support by recent experimental and epidemiologic work. Since 1941 he has seen 51 cutaneous cancers in the white population of Kenya Colony, where cutaneous cancer is second in frequency only to breast cancer. Most of the patients with cancer gave a history of frequent and prolonged exposure to the sunlight of equatorial Africa. The severe types of chronic sunburn described under the names of farmer's skin and chronic solar dermatitis were present in two-thirds of the patients with cancer. The conclusion seems to be justified that sunlight is the paramount factor in the causation of cutaneous carcinoma in Kenya. The farmer, rancher and white hunter are exposed to the equatorial sun by necessity; but the town dweller, following the command of fashion, exposes himself voluntarily with a truly alarming recklessness. The habit of dispensing with the Victorian sun helmet altogether and of participating in outdoor activities and sports without adequate protection is widespread among the younger generation of Kenya.

Neurology and Psychiatry: Sciatica: Treatment

J. Wery. Traitement hydrotherapique et crenologique des sciatalges (Hydrotherapy and crenology in treatment of sciatica.) Acta Physiotherapica et Rheumatologica Belgica, Brussels 1948, 3/1 (13-23). Abstracted by Radermecker-Antwerp in EXCERPTA MEDICA, 2:2:140, February 1949.

During the acute period rest in bed is the most effective treatment. During convalescence hydrotherapy is useful, first in the form of tepid tub-baths, then progressing to drip douche, underwater douche, tepid showerbaths at increasing temperatures, at first without pressure and then with light percussion; next light massage under the shower, then gentle kneading and finally the massage douche with terminal jet. In funiculities the Scotch (transition) douche often gives good results. In many spas fangotherapy is used (fegetable, fegeto-mineral or marine muds) which provokes distinct vasomotor reactions. Sometimes vapor baths are associated. Hydrotherapy promotes blood supply to the tissues and raises the pH. This is the critical feature of the cure, as excessive alkalosis endangers the results by slowing down capillary circulation. Hydrotherapy is of great value, but only under expert supervision.

Painful Sequelae of Injuries to Peripheral Nerves

S. Sunderland and M. Kelly. In AUSTRALIAN AND NEW ZEALAND JOURNAL OF SURGERY, 18:75, October 1948. Abstracted in JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 140:8:755, June 25, 1949.

In the 278 cases analyzed by Sunderland and Kelly, severe pain in the hand or foot persisted for at least five weeks after the receipt of an injury to a nerve trunk and the pain was not related to damage or to involvement of nonneural tissues. The term causalgia has been applied to this pain, which is primarily a sequel of gunshot lesions in which stretch of the nerve appears to play an important part. In the great majority of cases it follows damage to the main sensory pathways from the palm or the sole. The higher in this pathway the level of the lesion, the more likely is causalgia to ensue. Its incidence bears no relation either to neuroma formation or to the degree of visible damage to nerves or other tissues. Though sympathectomy has proved valuable, there is no other evidence to suggest that the sympathetic system is especially involved. The clinical evidence suggests that the painful sequelae of nerve injuries are the effect of the spread of damage to the central nervous system by retrograde and transneuronal changes. A center of abnormal spontaneous activity is thereby set up in the cord, which acts as a focal point for the dissemination of spreading disturbances involving wider and wider areas of the cord. These produce effects on the peripheral tissues via adjacent posterior roots (hyperalgesia), while a succession of abnormal impulses reaches the cerebrum, producing effects on the sensorium (spontaneous pain). Anatomic and physiologic evidence is produced which lends support to this interpretation. In most cases of causalgia there is spontaneous cure, and surgery should therefore be reserved for the cases of severe and stubborn causalgia.

Universal Splint for Hip Motion

Paul C. Thompson, M.D., Swannanoa, North Carolina, and James H. Cherry, M.D., Asheville, North Carolina. From the Division of Orthopedic Surgery, Swannanoa Division, Veterans Administration Hospital, Oteen, North Carolina. In THE JOURNAL OF BONE AND JOINT SURGERY, 31-A:2:434, April 1949.

It is generally agreed by most orthopedic surgeons that the end results of vitallium cup arthroplasty depend to a great extent upon the patient's will and determination to regain hip motion following surgery, with the assistance of physical therapy. This fact has led the authors to devise a universal splint for the lower extremity. The apparatus can be easily adjusted to fit all sizes and shapes of limbs, and is of such simplicity that it can be applied or removed within several minutes.

The results in this hospital in regaining hip motion by the use of this universal splint have been excellent. The splint has met with enthusiastic response on the part of the patients, who find that they are able to secure voluntary active and passive motion and to regain a wider range of motion of the affected limb than is possible with other types of mechanotherapy or with physical therapy alone.

Treatment of Acute Stage of Anterior Poliomyelitis (Study on Use of Curare)

M. E. Pusitz, M.D., Topeka, Kansas. In KANSAS MEDICAL SOCIETY JOURNAL, 50:1, January 1949. Abstracted in JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 140:8:754, June 25, 1949.

Pusitz treated 104 consecutive cases of acute infantile paralysis in the epidemic of 1946. Twelve cases of mild disease were treated in the home. In this group neostigmine was used alone with fair effect in relieving pain and muscle spasm. Of the 92 hospitalized patients, 14 were treated with hot packs; 3 of these were effectively treated with hot packs alone; 2 had neostigmine added to obtain relief. In 3 cases of hot packs and neostigmine the relief was not adequate, but immediately became adequate when the patients were switched to curare therapy alone. In 6 cases hot packs were not effective enough and so the patients were immediately transferred to treatment with curare alone without neostigmine. All obtained immediate relief with curare. Curare was used in a total of 53 cases. The drug was administered intramuscularly three times daily, starting with a minimum dose of 0.9 unit of intocostrin per kilogram of body weight, and increasing gradually until an effective dose was reached, never more that 1.5 units. In no case did curare fail to relieve pain to the major extent, and the same was true for muscle spasm. There was absolutely no residual paralysis in 57 of the hospitalized and in 11 of the not hospitalized patients. There were 6 deaths. There were 6 cases of involvement of the upper extremities, and in only 1 of these was there residual paralysis of the deltoid. Of 17 patients with braces, 4 discarded the braces within four months. Thirteen were still using braces in November 1947. Two were seriously paralyzed with involvement of the upper and lower extremities. No true scoliosis has appeared and all contractures have so far been adequately taken care of.

The Heating of Human and Animal Tissues by Means of High Frequency Current of 12 Cms. Wavelength (The Microtherm)

Stafford L. Osborne, Ph.D., and Jesse N. Frederick, B.A., M.S. In QUARTERLY BULLETIN OF NORTHWESTERN UNIVERSITY MEDICAL SCHOOL, 23:2:222, Summer 1949.

Microwave radiations were applied to the thighs of dogs and temperature measurements made subcutaneously, and at one-half inch intervals to a depth of 2 in. Following exposure to high frequency energy the maximum temperature was observed in the subcutaneous level and decreasing temperatures found with increasing depth. The average temperature at a depth of 2 in. of ten experiments using the 6-inch hemispherical director at a spacing of one inch from the skin surface was 104.1 F.

In seven acute experiments on dogs the eye was exposed to microwave treatment. The average temperature of the vitreous humor following microwave treatment was 105.8 F. One animal received a series of six treatments over a period of three weeks. There was no evidence of damage to the eyes or contiguous tissues.

Six experiments were performed in which the frontal sinus of the dog was exposed to microwave radiations. The average of the temperatures of the frontal sinus following exposure to the microwave was 105.1 F.

In twenty-four experiments on human subjects the thigh was exposed to microwave radiation. The average temperature at a depth of approximately 2 in. immediately following microwave irradiation was 104.2 F. One small superficial blister was produced. By the tenth day the blister had disappeared. The treatments were comfortable to the patients and a minimum of erythema was noted. Microwave treatment should be applied cautiously because the minimum of erythema and discomfort to the patient gives the operator less warning of overheating. The limitations of the localized heating by this method have been pointed out.

Present Position of Radiotherapy in Medical Practice

B. W. Windeyer, M.D., London, England. In JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 140:8:665, June 25, 1949.

The whole question of the control and use of radioactive isotopes is one of great importance. In Britain we have not yet had the opportunity of using them for therapeutic purposes, but have followed the published work with close interest. We feel that their method of action on normal and pathologic tissues, the clinical reactions produced and, in particular, the dangers of severe and permanent damage which may occur from their use make it essential that they should be used by workers who are fully trained in the use of radiations on human tissues. It is obvious that the best results will be obtained, both with regard to rapid accumulation of knowledge and to efficient treatment of patients with the minimum risk, if the therapeutic use of radioactive isotopes is in future entrusted to radiotherapists.

Therapeutic Criteria in Rheumatoid Arthritis

Otto Steinbrocker, M.D., Cornelius H. Traeger, M.D., and Robert C. Batterman, M.D., New York. In JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 140: 8:659, June 25, 1949.

The first consideration in undertaking the treatment of a patient with rheumatoid arthritis is to determine:

(1) the stage of the disease, (2) the presence of rheumatoid activity and (3) the degree (class) of functional impairment. A patient therefore would be classified as having rheumatoid arthritis, active or inactive, stage ....., class ..... .

With treatment the stage of the disease rarely improves. However, either rheumatoid activity or functional impairment, or both, may respond. For the purposes of clinical evaluation of response to treatment, therefore, there are two variables—rheumatoid activity and functional impairment. It is the opinion of the Committee that rheumatoid activity represents the crucial basis for assessment of the effectiveness of any therapeutic agent. For the purposes of evaluation of the response of rheumatoid activity to any treatment, the signs of active disease presented by the patient at the initial examination constitute the maximum evidence of rheumatoid activity in that person, and form the basis for determination of response to therapy by decrease in those signs of activity. For example, a patient at the beginning of treatment may be in stage III, active, class IV, and can, after a suitable period of therapy still be in stage III, yet may show grade II improvement of rheumatoid activity and class II functional capacity. The classification of functional impairment together with the criteria for therapeutic response of rheumatoid activity can give a helpful insight into the usefulness of the whole treatment program, which may include such general procedures as physical therapy, rehabilitation measures, psychotherapy, orthopedic corrections, analgesic and constitutional therapy and many others. For the purpose of evaluating specific therapeutic agents, this Committee recommends that reports of such treatment should be based only on the "Criteria for Therapeutic Response of Rheumatoid Activity."

Book Reviews

Life is for Living. *By D. Ewen Cameron, M.D. Cloth. Price, $2.75. Pp. 241. The Macmillan Company, 60 Fifth Avenue, New York 11, 1948.*

There have been many books written in the past few years which pretend to be guides to living. They are attempts to convert into the layman's language our complex psychiatric formulations. They are replete with naive examples and case histories. Most of them are more confusing than clarifying. Doctor Cameron has made a radical departure from such a format. In his small book he presents very sound, logical and interesting thinking. Much of this book reflects his own wide experience with the fields of psychology and psychiatry. The finished product contains practical philosophy for the art of living which the individual can reduce to his own terms.

There are fourteen chapters on a wide variety of subjects. For example, the chapter on "Growing Old" presents the problem of aging and its attendant insecurities in such a way that one gets a bird's-eye view of the subject and at the same time carries away insight which can yield practical methods of management. The chapter on "Work" is a very penetrating discussion of one of the great problems of present-day industry in which people are being geared to machinery and being expected to perform as a machine.

The author has used simple but by no means condescending language. His presentations are clear, to the point, and devoid of any complicating intellectualisms. Case material is brought in where necessary, only to exemplify a point and not to attest to the brilliancy of the author's diagnostic or therapeutic abilities. This book is highly recommended for anyone interested not only in psychiatry but in our present-day world.

Textbook of the Rheumatic Diseases. *Edited by W. S. C. Copeman, O.B.E., M.D., F.R.C.P., Physician to the Rheumatism Department and Lecturer in the Medical School, West London Hospital; Physician to Arthur Stanley Institute of Rheumatic Diseases (Middlesex Hospital), and Hunterian Professor, R.C.S.; Senior Physician to the Hospital of St. John and St. Elizabeth; Consultant for Rheumatic Diseases, Royal Hospital for Incurables and Consultant to L.C.C.; Hon. Medical Secretary, Empire Rheumatism Council; Member of Minister of Health's Advisory Sub-Committee; Chairman of Chartered Society of Physiotherapy, etc. Cloth. Price, $12.50. Pp. 612, with 351 illustrations. The Williams and Wilkins Company, Mt. Royal and Guilford Aves., Baltimore 2, Md., 1948.*

There is at present no textbook in this specialty. The editor and the twenty-four contributors have successfully collected and collated modern knowledge from the best British sources. In the thirty chapters there are several chapters on climate and environmental factors, physical therapy, hydrotherapy and spa treatment of the chronic rheumatic diseases.

This book will serve physical therapists as an excellent reference book on rheumatic diseases.

Atomic Energy. *By Karl K. Darrow, Ph.D. Being the Norman Wait Harris Lectures Delivered at Northwestern University. Cloth. Price, $2. Pp. 80, with 13 illustrations. John Wiley & Sons, Inc., 440 4th Ave., New York 16; Chapman and Hall, Ltd., 37-39 Essex St., Strand, London, W.C. 2, 1948.*

Doctor Darrow, the eminent physicist with Bell Telephone research laboratories, gave these four Norman Wait Harris lectures at Northwestern University before an audience whose special fields of interest were other than physics. The objective of the lectures was not to see how much could be squeezed into four lectures but rather to develop and stress and reiterate the salient features of the subject, introducing little that might divert the reader into bypaths, however fascinating.

It is not a treatise on nuclear physics, but a narrative of the basic facts most pertinent to the transformation of energy of rest mass into energy of motion and energy of heat which is what is meant by atomic energy. The lecturer used very simple language and it is written in a most entertaining and absorbing manner. In lecture one Doctor Darrow states: "But if you are going to remember only one thing from this lecture, I beg of you let it be this: the term 'atomic energy' is a boner, and such a boner as would get a very black mark from any conscientious professor of chemistry or physics. If that term means anything it means the chemical energy such as we get by burning coal and digesting a beef steak."

The author has taken a very difficult subject and discussed it in terms that the average individual can grasp. It is not cluttered with a lot of mathematical formulae. The book is highly recommended to those who wish to keep abreast of the developments in science.

Atlas of Peripheral Nerve Injuries. *By William R. Lyons, Ph.D., Associate Professor of Anatomy, University of California Medical School, and Barnes Woodhall, M.D., Professor of Neurosurgery, Duke Medical School, Durham, N. C. Cloth. Price, $16. Pp. 339, with illustrations. W. B. Saunders Company, West Washington Square, Philadelphia, 1949.*

The few and almost embryonic centers in which neurosurgery was done in World War I were replaced in World War II by nineteen well-organized, well-equipped and well-staffed neurosurgical centers in which important advances were made in many branches of neurosurgery, including craniocerebral trauma, spinal cord injuries and in particular nerve injuries.

This situation was turned to the advantage of peacetime neurosurgery by the initiative and efforts of these two authors: Doctor Lyons of the University of California who is an experienced neurohistologist with a full appreciation of clinical values, and Doctor Woodhall, Professor of Neurosurgery at Duke University School of Medicine, who is an experienced clinician with a sound training in neuropathology. These authors have had years of experience teaching medical students.

This book is of particular interest to the physical therapist because it has many illustrations of clinical neurosurgery and gross and topographic cross sections with the descriptions of these in the text. These make this book invaluable as a reference book to every person treating a peripheral nerve injury. In every course for physical therapists they should read this work.

The static neuropathologic elements that are present in war wounds of peripheral nerves have been illustrated and described in the pages of this atlas. In approximately 550 of these patients, pathologic specimens of nerve segments have been preserved, and much of this material has been studied from the histopathologic point of view. If the professional, administrative and financial hazards of surveying large groups of rehabilitated war veterans can be surmounted through governmental or private channels, the influence upon peripheral nerve regeneration of the neuropathologic changes that have been described in this atlas will be the subject of a separate monograph within the next few years.

Poliomyelitis: Papers and Discussions Presented at the First International Poliomyelitis Congress. *Compiled and edited for the International Poliomyelitis Congress. Cloth. Price, $5. J. B. Lippincott Company, East Washington Square, Philadelphia 5, 1949.*

The book is divided into ten sections corresponding to the ten sessions which were held at the conference.

Poliomyelitis as a world problem was presented in the epidemiologic patterns in different parts of the world showing the tendency toward increase of the incidence of infection in higher age groups.

Marked variations in the characteristics of epidemics were discussed. The discussants were prepared to elaborate on specific problems which were beyond the scope of the papers presented.

The pathologic anatomy and physiology were described as were the evolution of the signs and symptoms of poliomyelitis.

The diagnosis and treatment of the early and convalescent stages were discussed from several different points of view. Progressive disabilities and deformities were explained in the light of the progressive pathology of poliomyelitis. A special section is devoted to the problems of rehabilitation and the management of the late stage of poliomyelitis. The pathologic aspect, neurologic signs and essential treatment of bulbar poliomyelitis were comprehensively outlined. Immunology and chemotherapy as applied to the mechanisms of immunity and varied types of poliomyelitis with the experimental chemotherapy which has been conducted is presented.

A discussion of the public health aspects as related to hospitalization and families of children with poliomyelitis occupy one section.

Delegates from many foreign countries outlined the history of poliomyelitis in their respective countries in the last section of the book.

The Growth of a Profession: The History of The Chartered Society of Physiotherapy, 1894-1945. *By Jane H. Wicksteed, O.B.E., M.C.S.P., Member of the Council and First Branches Organizer of the Chartered Society of Physiotherapy. Fabrikoid. Price, 6/- net. Pp. 212, with 13 plates. Edward Arnold and Co., 41-43 Maddox Street, London, England, 1948.*

This story of The Chartered Society of Physiotherapy is compiled for the most part from the official records of that Society. However, the author emphasizes that she does not claim to have stifled all personal impressions.

The Society originated as the Society of Trained Masseuses due to the inspiration and efforts of two young nurses, Rosalind Paget and Lucy Robinson. In the early 1890's massage was finding its way into the armamentarium of the medical profession and it was the determination of these early leaders to make it "a safe, clean and honorable profession for British women." The very first professional rules set up by this organization stated "no one should undertake massage except under definite orders from a qualified medical man."

Throughout the entire history of this society the high professional standards established by the early leaders have been maintained. By 1920 the scope of the Society was broadened to include the medical gymnasts, a charter was obtained and the name changed to The Chartered Society of Massage and Medical Gymnasts. During World War II because of the broadened field the name was again changed to The Chartered Society of Physiotherapy. In the space of approximately fifty years the membership grew from eleven to approximately 17,000.

Every member of the American Physical Therapy Association should read this interestingly written history because the problems of the Society so closely parallel those of our American group.

In the epilogue the author states: "A great work has been started and for fifty years it has progressed, not always at the same pace, not without mistakes, not without distress, not without personal antagonisms—but mistakes and distress stimulate to further effort, and the errors as well as the wisdom of those who have gone before are a challenge to those who follow."

Diabetic Manual for the Doctor and Patient. *By Elliott P. Joslin, M.D., Sc.D., Medical Director, George F. Baker Clinic at New England Deaconess Hospital, Boston. Eighth edition. Cloth. Price, $2.50. Pp. 260, with 51 illustrations. Lea & Febiger, 600 S. Washington Square, Philadelphia 6, 1948.*

Experience has proven that a long and useful life is possible for all diabetics who are willing to aid themselves by understanding their conditions and working with their physician in establishing proper treatment. The purpose of this book is to give diabetic patients all the information, instruction and guidance necessary to make this possible. Diet calculations and other elements of treatment which the patient can do for himself are simplified.

This manual should be valuable to the physician for distribution to his patients.

Meet Our Contributors

Bartenieff-Dombois, Mrs. Irmgard, 171 East 83rd St., New York 28, N. Y. Mrs. Bartenieff-Dombois attended the German Gymnasium, Berlin, and spent two years studying biological sciences at the University of Munich and Berlin. She also attended the Schule f. Kranhangymnashik, University of Freiburg, Germany, and had one year at the New York University School of Physical Therapy from which she graduated in 1944. Prior to graduation from New York University, she did private work for physicians in New York and Pittsfield, Mass. In 1943 she served as physical therapist at the Hospital for Joint Diseases, New York City; in 1944 as physical therapist in Bellevue Hospital and Willard Parker Hospital, and in 1947 became Supervisor of Physical Therapy, Polio Unit, Willard Parker Hospital, New York City, which position she now holds. Before entering the field of physical therapy, Mrs. Bartenieff-Dombois received her diploma of Modern Dance and Dance Movement Research and Notation. First in Laban, then Germany. Member: International Dance and Movement Notation Bureau (Laban) in New York.

Harker, Virginia Holt, Central Carolina Convalescent Hospital, Inc., Greensboro, North Carolina. Miss Harker received her B.S. degree from Temple University in 1934 and her M.S. degree from the University of Pennsylvania in 1941. Her physical therapy certificate was received in 1945 from Columbia University. She has had extensive experience in epidemic work with infantile paralysis patients in Rockford, Illinois; Mississippi, and Greensboro, N. C. At present she is Physical Therapy Supervisor, Central Carolina Convalescent Hospital, Inc., Greensboro, North Carolina.

Haskell, Mary E., 1790 Broadway, New York 19, N. Y. Miss Haskell graduated from Bouve-Boston School of Physical Education in 1928. Since that time she has spent thirteen years at the North Carolina Orthopedic Hospital, three and one-half years with the United States Army, one year with the Veterans Administration, one year compiling the Hospital Manual for the American Physical Therapy Association, and at present is Polio Consultant for the American Physical Therapy Association. She is also Secretary of the American Physical Therapy Association.

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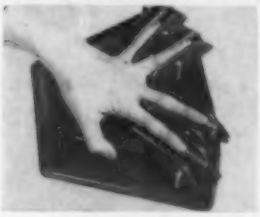

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